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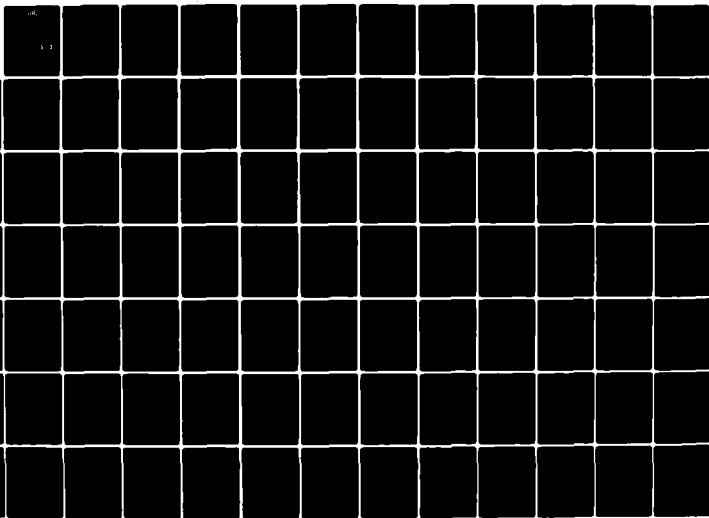
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THE EFFECTS OF A CONTEXTUAL VISUAL
ON RECALL MEASURES OF LISTENING COMPREHENSION
IN BEGINNING COLLEGE GERMAN

DISSERTATION

① Doctoral Thesis

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

AFIT

By

Gunther A. Mueller, A.B., M.A.

* * * * *

The Ohio State University

1979

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ABSTRACT

The Effects of a Contextual Visual on Recall Measures of Listening Comprehension in Beginning College German.

By Gunther A. Mueller, Captain, USAF.

1979 Ph.D. Dissertation in Foreign Language Education at The Ohio State University. (122 pages).

Two experiments were conducted to test the effects of visual support for listening comprehension with beginning German students at the United States Air Force Academy. It was hypothesized that a contextual visual would facilitate listening comprehension on the basis of its ability to activate and bring to bear on the listening process relevant elements of stored memory. Subjects in Experiment I (N=123) had studied little or no German in high school, while those in Experiment II (N=76) had studied between four and six semesters of high school German.

Each experiment consisted of three experimental conditions: 1) seeing a contextual visual before hearing a taped listening passage, 2) seeing a contextual visual after having heard the taped passage, 3) hearing the taped passage without seeing a visual. The dependent variable (criterion measure) in these experiments was a seven-minute, free-recall English summary of the passage written immediately following the experimental conditions. The summaries were scored on the basis of the number of valid semantic propositions they contained.

The data from the two experiments were submitted to separate analyses of variance. With respect to the visual

7 versus no-visual experimental conditions, statistically significant differences at or beyond the 0.05 level were found between the groups in Experiment I (less proficient students), but no significant differences were found between the groups in Experiment II (more proficient students). The results of this study suggest 1) that the effects of a contextual visual are inversely related to the listener's level of proficiency and 2) that visual support does not in and of itself facilitate listening comprehension.

Dedicated
To My Parents
Mr. William K. Mueller
Mrs. Hedwig F. Mueller

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CHAPTER I

THE PROBLEM

Introduction

Today, visual instructional aids are being used in varying degrees at all levels of foreign language education. Visual aids are intertwined with virtually all facets of the teaching-learning process. Professional leaders in pedagogy, materials development, and media support promote the use of visual aids largely as:

- 1) motivational tools,
- 2) focuses of attention,
- 3) mnemonic devices,
- 4) reinforcement for aural or written stimuli,
- 5) a means to "by-pass" native language, and
- 6) as a means to accommodate diverse learning styles.

Jenks (1975) claims that combining visuals with other

materials "promote individual learning" (p. 111); Birkmaier (1965) says that visuals "add a dimension of meaning to second language learning" (p. 95); Kirsch (1969) suggests, moreover, that visuals "provide the bridge between sound and meaning" (p.32). How visuals serve these purposes, under what circumstances and for whom, remain, however, important, unanswered questions.

Visuals are used to illustrate, clarify, amplify, reinforce, and integrate instructional materials, presumably on the basis of their ultimate effect on comprehension and learning. Yet, as Omaggio (1977) points out, "the foreign language teaching profession has virtually no empirical basis for promoting the use of visuals as aids to comprehension; we know practically nothing about how students benefit, if in deed they do, from visual materials" (p. 1). From a study investigating the effects of pictorial stimuli on learning selected English words, Suwanarat (1978) concluded: "Pictures did not make learning easier; they tended to distract the children from the printed word" (p. 623). Hammerly (1974) empirically tested the widespread view that using pictures results in the avoidance of the native language and in direct thinking in the foreign language. The findings of his study "suggest the inadvisability and the futility of relying only on pictures in order to convey meanings to

beginning second language students" (p. 124). Findings such as these clearly amplify Jarvis' (1970) assertion that "the nature of optimal visual support and identification of its appropriate role in the instructional strategy remains a matter in need of considerable research" (p. 91).

In a time when the development of audiovisual materials is what Jenks (1975) calls "one of the biggest growth areas in education" (p. 111), it behooves each teacher and the profession at large to investigate the potential of these materials in specific instructional settings and to establish an empirical basis for their most effective use. The field of educational communication, still in its infancy, has been unable to provide much more than suggestions for using various instructional aids. In reviewing the results of several major studies on educational media, Salomon and Clark (1977) conclude that "recent summaries of and comments on media research unanimously agree that media research has, in fact, yielded very little (e.g., Allen, 1971; Gordon, 1969, 1970; Jamison, Suppes and Wells, 1974; Saettler, 1968; Snow and Solomon, 1968)" (p. 100). Olson's (1974) remark on the "state of the art" of media research is also discouraging. He writes:

We know neither how to describe the psychological effects of ... technologies nor how to adapt them to the

purposes of education. The impact of technologies both ancient and modern on children's learning is either negligible or unknown (p. 6).

In the absence of definitive guidance on the use of instructional aids from media research, it seems clear that each discipline must test and evaluate instructional aids on the basis of specific requirements. Recent research studies in foreign language education have failed, however, to address adequately the problem of empirically testing the effects of audio and visual materials. Frechette (1976) reviewed 300 foreign language related studies conducted since 1970 to determine the topical areas of interest. From this review, he concludes: "little notice seems to have been given to audio-visual materials..." (p. 384).

Despite the dearth of information to guide the effective use of visuals, teachers use these instructional aids daily. Unfortunately, the decisions regarding selection and employment of visual aids must often be made on the basis of intuition, conjecture, or simply availability of the material. Clearly, situation-specific research evaluating the effects of combining visuals with various instructional strategies is desperately needed so that the most effective combinations can be identified. The results of such research can then provide an empirical basis to guide instructional

design decisions involving visual support.

Because of the "conspicuous absence of research relating to audio and visual materials" (p. 363) reported in Frechette's (1976) trends assessment, it seems clear that such research is needed in all facets of the foreign language teaching-learning process. Of specific interest in the present study, however, is the area of listening comprehension--"an extremely important skill, badly in need of re-emphasis in the contemporary foreign language curriculum" (Quinn and Wheeler, 1975, p. 2). The underlying rationale for conducting a study designed to investigate the effects of visuals on recall measures of listening comprehension is twofold:

- 1) "Listening is the least understood of the four language skills and consequently the least well taught" (Pimsleur, et al., 1977, p. 2).
- 2) Native-language listening comprehension (information processing) seems to result from a complex interplay of linguistic and extralinguistic, contextual (often visual) information cues.

There seems to be general agreement on the important role that context (extra-linguistic information) plays in native language processing and communication in general. Glucksberg and Danks (1975) point out that "...our knowledge of the world is required to help us comprehend and interpret what we hear" (p. 115). Commenting on the importance of set in listening, Rivers (1976)

states: "We hear what we expect to hear" (p. 122). What we expect to hear is, moreover, often a function of context (a situation, time of day, persons interacting, etc.). Although it is often possible for a person to understand or even construct a context from the linguistic cues he hears, it is usually unnecessary because visual cues provide the extra-linguistic (contextual) information used to interpret the message. If, however, a person is unable to construct a context from purely linguistic cues, and if visual cues are not available, comprehension is almost certainly impeded.

Bransford and Johnson (1972) conducted several studies investigating the relationship between context and listening comprehension. On the basis of their research findings, these authors assert that a semantic context is often a prerequisite for comprehension. They point out, moreover, that comprehensibility of listening material can be enhanced substantially by contextual visuals, particularly when the context of the material is not readily apparent from the linguistic cues. Because the nature of most foreign language listening materials makes it difficult for the listener to glean a context from purely linguistic cues, adding a contextual visual to such listening material may dramatically increase comprehensibility. Applying this premise to reading comprehension, Omaggio (1977) conducted a study investigating

the effects of selected contextual visuals on reading comprehension measures in French. Results of this study showed that certain contextual visuals do facilitate reading comprehension. Because the facilitative effects are believed to have been "process oriented," it seems reasonable to hypothesize that contextual visuals may have similar effects on the listening comprehension process.

Using a combination of the findings reported by Omaggio (1977) and Bransford and Johnson (1972) as a base, this study is designed to investigate further the potential role of contextual visuals in foreign language listening comprehension.

Purpose of the Study

The purpose of this study is to evaluate the effects of a contextual visual on recall measures of listening comprehension in beginning college German students. More specifically, the study will address the following research questions:

- 1) What are the effects of a contextual visual on recall measures of listening comprehension?
- 2) What are the effects of varying the locus of a contextual visual in the

sequence of events on recall measures of listening comprehension?

- 3) Do the effects of a contextual visual vary with students' aptitude as measured by prior achievement in language learning?
- 4) Are there any significant interactions between aptitude (prior achievement) and availability of a contextual visual?

Theoretical Bases

Elements of cognitive learning theories advanced by Ausubel *et al.* (1978), Smith (1975), and psycholinguistic research results on native language listening comprehension provide the theoretical underpinnings for this study. According to Smith (1975), comprehension (and learning) is simply the process by which a person effectively relates new information to what he already knows. The result of this comprehension process is a semantic product or representation that is stored in memory. A person is believed to attempt to comprehend by generating and testing hypotheses on the basis of his store of knowledge (cognitive structure) and then, if necessary, altering that store of knowledge to accommodate the newly learned material. In Smith's view,

comprehension is a function of 1) what the person trying to comprehend already knows and 2) how much of what he knows can be brought to bear on the comprehension process. In short, comprehension involves a complex interaction of input information and prior knowledge resulting in a semantic product or representation.

The specific contributions made by the input information and the prior knowledge, and the degree to which either of these elements affects the final product remain unknown. Research results suggest, however, that manipulating elements of prior knowledge seems to influence both the process and products of comprehension. Furthermore, the extent to which prior knowledge influences the comprehension process is, at least in part, a function of the degree to which existing elements of prior knowledge relevant to the task can be activated during the process. The question of how and under what circumstances these existing elements of cognitive structure can be activated is still largely a matter of conjecture.

In the theoretical domain, Ausubel et al. (1978) suggest that "advance organizers" can help to activate elements of cognitive structure by providing an organizational scheme in which new information can be processed more meaningfully. Ausubel sees the function of "advance organizers" as helping to provide a meaningful learning

set. Of the several reasons Ausubel offers for promoting the use of "advance organizers," the following seems most relevant to the present study:

They explicitly draw upon and mobilize whatever relevant anchoring concepts are already established in the learner's cognitive structure and make them part of the subsuming entity. Thus, not only is the new material rendered more familiar and meaningful, but the most relevant ideational antecedents in cognitive structure are also selected and utilized in integrated fashion (1978, p. 174).

Johnson (1975) supports the notion of "advance organizers" by suggesting that "the major consequence of adopting a meaningful learning set may be the arousal of referential associations relating to the material to be learned" (p. 443). While the efficacy of "advance organizers" is not universally accepted, compelling evidence of their facilitative effects is well documented in the education and psychology literature.

This study is designed to investigate the role of contextual visuals used as pictorial advance organizers to establish a more meaningful listening set. It is hypothesized that a contextual visual will help the listener establish an organizational scheme within which he can more meaningfully process the incoming material. The organizational scheme is further hypothesized to enhance comprehensibility on two dimensions. First, the scheme

will help the listener formulate more reasonable hypotheses by reducing the number of alternatives he must be prepared to listen for. The organizational scheme is hypothesized, moreover, to provide the listener with an additional vehicle (non-linguistic cues) for gaining access to his existing store of knowledge. In short, the underlying basis for this study is to investigate, in a foreign language classroom listening situation, the efficacy of Linisay and Norman's (1977) assertion that "the more we know about what is to come, the easier it is to perceive what is at hand" (p. 277).

Operational Definitions

The terms used in this study are defined as follows.

1. Contextual Visual: A simple line drawing depicting a scene or set of objects central to the theme of the passage. The objects are depicted with their relevant relationships to one another and to the theme of the passage. Furthermore, the visual provides relevant thematic information on two dimensions: descriptive and connotative. The descriptive dimension depicts elements of physical reality, while the connotative dimension conveys the general tonality of the passage by depicting the social setting, important concepts, and the relevant relationships. From a functional perspective, the contextual

visual is designed to limit the number of topical alternatives the listener need be prepared to listen for. In other words, a contextual visual depicting a wedding scene would be inappropriate for a passage dealing with a soccer game. While the specific composition of a contextual visual will vary with the nature of the material, the composition should be dictated by the general knowledge of a topic that the listener and speaker (passage) share on the basis of their knowledge of the world. Although the contextual visual is not designed to illustrate or define a particular passage, it should not be viewed as the solution to a problem or puzzle presented in the passage. In short, the purpose of the contextual visual is to provide a "framework" within which several passages (dealing with the same general topic) could be related and understood.

2. Listening Comprehension: This term is used in its more global sense of demonstrating the ability to attach meaning to aural stimuli. As the title of this study indicates, only the recall dimension of listening comprehension is being investigated. The subjects' ability to recall and produce (in English) semantic propositions or idea units (defined in Chapter III) from the passage will be used as a measure of listening comprehension recall. An increase in the number of propositions

produced will be assumed to show a corresponding increase in comprehension. There is no implication, however, of a one-to-one relationship between the number of propositions produced and comprehension. The number of propositions is simply a quantitative index of comprehension.

3. Availability of Contextual Visual: This term refers to the presence and locus of the contextual visual in the sequence of events. There are three possibilities (levels of this independent variable): seeing the contextual visual before hearing the test passage, seeing the contextual visual after having heard the test passage, and not seeing the contextual visual.

4. Aptitude: Subjects in this study are divided into two aptitude groups: High and Low. The measure of aptitude used to assign subjects to one of the two groups will be prior achievement in the immediately preceding German course. Each intact class of students will be rank ordered on the basis of their final grades in the preceding German course. This distribution will be divided at the median score, placing those students from the upper half of the distribution into the high-aptitude group and those students from the lower half of the distribution into the low-aptitude group.

Assumptions and Limitations

The following assumptions were made in order to conduct the present study:

- 1) It was assumed that there is a relationship between the experimental conditions and normal, unstructured language processing.
- 2) It was assumed that subjects for whom the contextual visual was available actually viewed the visual.
- 3) It was assumed that there is a relationship between a person's ability to understand taped material and his ability to understand live speakers.
- 4) It was assumed that a person's ability to write a summary containing semantic propositions presented in a taped passage is a measure (not the only measure) of his ability to understand that taped passage.

In a research area as elusive and poorly understood as foreign language listening comprehension, one study can only hope to add small bits of information to existing knowledge. No broad theories of language learning or pedagogy can be expected from any one study. It must

be pointed out that this study is investigating only a very small portion of the listening comprehension process. Before much definitive information about this complex process is discovered and understood, studies such as this one must be replicated, and related studies must be conducted.

While it can be argued that the effectiveness of a contextual visual is a function of the nature of the material and the quality of the visual, it is hoped that other studies using different materials and visuals will be conducted to investigate this problem further. The results of the present study can only be generalized to other situations using essentially the same kinds of materials. This limitation need not deter other researchers from investigating this or similar problems from a slightly different perspective. In fact, it seems that only through concerted efforts to build slowly but firmly on existing bits of knowledge can researchers and teachers begin to understand the complexity of learning and using a second language.

Value of the Study

This study has potential value from two broad perspectives. First, the results of this study may help to clarify and define more precisely the role of visual

support in a particular instructional setting. On a different dimension, the results of this study may add empirical support to existing theories of listening (language) comprehension. While visuals and listening comprehension materials have been combined in various forms before, this study is the first effort in evaluating the effects of visuals used specifically as contextual organizers in foreign language listening comprehension.

In addition to clarifying the role of visuals in a particular instructional setting, this study further seeks to assess the effects of visuals on two types of foreign language learners: efficient learners (high aptitude) and less efficient learners (low aptitude). The increased professional interest in trying to help the heretofore less proficient language learner become more successful argues for increased emphasis on learner differences with regard to instructional strategy. Assessing the effects of contextual visuals on different learners may provide information useful in planning and executing individualized instruction programs.

Finally, it is hoped that this study will add valuable information to the existing knowledge on contextual visuals as aids to comprehension, and serve as an impetus to further research in this area.

CHAPTER II

RELATED RESEARCH

Introduction

The seventeenth-century Czech educator Comenius published the first illustrated textbook, Orbis Pictus, (a foreign language book) in 1658 (Huebener, 1967). Since that time, visuals have played a prominent role in virtually all aspects of the foreign language teaching-learning process. Today, Jenks (1975) sees audio-visual aids as "contemporary keys to more personalized and more intensive learning" (p. 111). This assumption, however, despite its widespread acceptance in the foreign language teaching profession, needs empirical support. Moreover, questions such as what kinds of visuals are most effective, under what set of circumstances, and for what type of learner, have barely been addressed, much less answered.

This review of literature will draw heavily from psycholinguistic research on native language listening comprehension because, 1) there is a paucity of research results on using visuals in foreign language education, and 2) the limited number of studies available deals primarily with visuals as semantic conveyors and not as aids to comprehension. It must be emphasized that visuals as aids to comprehension on the basis of their potential as advance organizers is viewed as a very specific problem. In order to maintain the proper perspective on the present study, only those studies dealing with pictorial effects relative to comprehension will be reviewed. Consequently, those studies dealing with other pictorial effects, visuals as semantic conveyors, channel reinforcement, etc. will not be addressed. Because the present study focuses on visuals as contextual advance organizers and specifically as aids to comprehension, the following related research areas are considered most relevant:

- 1) Advance Organizers
- 2) Theoretical Nature of Listening
Comprehension
- 3) Language (Listening Comprehension)
and Context
- 4) Pictorial Effects on Comprehension

Research on Advance Organizers

The concept of advance organizers (Ausubel, 1978) is central to this study. More specifically, Ausubel's notion of advance organizers "drawing upon and mobilizing whatever relevant anchoring concepts are already established in the learner's cognitive structure" (p. 174) has the most direct and powerful implications for the present study. Moreover, Ausubel's characterization of advance organizers as having "a high level of abstraction, generality and inclusiveness" (p. 171) theoretically supports using visuals as organizers and is consistent with the definition of contextual visuals developed for this study.

Hartley and Davies (1976) see advance organizers as "providing a conceptual framework that students can use to clarify the task ahead" (p. 244). Contrasting advance organizers with other preinstructional strategies (overviews, outlines, and pre-tests), these authors point out that advance organizers are "process oriented" while the other strategies are "content oriented." This "process-content" distinction seems to be totally consistent with Ausubel's view of the function of advance organizers. Moreover, this distinction is central to the present study because the contextual visuals (as defined herein) are hypothesized to affect the process of

comprehension and not to convey information directly.

Several major studies reviewing, analyzing, and synthesizing the accumulated research on advance organizers have recently appeared in the literature (Barnes and Clawson, 1975; Hartley and Davies, 1976; Lawton and Wanska, 1977). Additionally, Ausubel (1978) has written an emotionally-charged reply to the critics of advance organizers. These studies do not present a very unified picture of the research results on advance organizers. From their review of 32 advance-organizer studies, Barnes and Clawson (1975) concluded: "The efficacy of advance organizers has not been established" (p. 651). These authors found advance organizers to have had facilitative effects in only 12 of the 32 studies they reviewed. In a reply to Barnes and Clawson (1975), Lawton and Wanska (1977) point out, however, that this type of study is of "limited value." They write:

These inconsistencies in presentation of findings tend to 'promote' a more negative case for the effects of advance organizers. Finally, and most importantly, it may be added that this type of analysis only provides superficial information on the results of selected investigations.

Hartley and Davies (1976) report that, while advance organizers were found to have had facilitative effects in many of the initial studies (1960 to 1967), the results of studies conducted since 1967 "are not so overwhelmingly

in favor of advance organizers" (p. 255). Despite this apparent inconsistency, these authors concluded that advance organizers were shown to have had facilitative effects in the majority of the 25 studies they reviewed. In their view, the most serious problem in research on advance organizers lies in the lack of an acceptable way of generating or recognizing advance organizers. In short, it has been difficult for researchers to operationalize and analyze this construct consistently. Ausubel (1978a), on the other hand, does not see this as a problem. He writes:

From the exhaustive and explicit general discussion of the definition, nature, and effects of an organizer in various publications..., plus the description of how to construct an organizer for a particular topic (Ausubel, 1968), there should be no difficulty for different researchers to construct comparable operationalized organizers for particular learning passages and to replicate each others' studies (p. 252).

In summary, it seems reasonable to conclude that advance organizers, when properly constructed and used, do facilitate learning and comprehension, perhaps to the degree that the construct of "advance organizers," as defined by Ausubel, is operationalized. Lack of agreement on the research results notwithstanding, the facilitative effects of advance organizers can be supported on relatively firm theoretical and empirical grounds.

Theoretical Nature of Listening Comprehension

Defined in its broadest sense, listening comprehension is "turning words into ideas, trying to reconstruct the perceptions, feelings, and intentions the words were meant to grasp" (Clark and Clark, 1977, p. 3). Rivers (1975) calls listening "a complex operation, integrating the distinctive components of perception and linguistic knowledge in ways which are at present poorly understood" (p. 58). Smith (1975) points out that "the meanings of utterances--lie outside the utterance, in the mind of the speaker or the listener" (p. 107). The myriad other definitions implying that listening comprehension is the result of relating an intelligible linguistic message to aspects of past experiences clearly suggest that there are at least two separate sources of information at play in this highly complex process. "Understanding the words" in a linguistic message is at best only a part of the process.

Of the countless variables involved in the listening process, those identified with memory for prose, and more specifically, those dealing with what Clark and Clark (1977) call "memory for substance" seem to have the most powerful implications for this study. Clark and Clark define memory for substance as memory for the "products" of comprehension. These products of

comprehension are thought to be stored in memory and subsequently retrieved when the listener is asked to recognize or recall parts of what he has heard. The products of comprehension are the result of a complex interplay of information (input and prior knowledge) and strategies used by the listener.

In synthesizing research on native language listening comprehension for prose, Clark and Clark (1977) identify the following four empirically based listener strategies:

- 1) Drawing implications on the basis of one's knowledge of the world.
- 2) Using established referents to relate and integrate new information.
- 3) Inferring indirect meaning by building interpretations on the bases of what was thought to have been meant.
- 4) Creating global representations by relating all sentences to capture the situation (context) being described.

All of these strategies are consistent with the notion of comprehension being a process of integrating input

information and some form of "outside" information, that is, information not contained directly in the input message.

Lindsay and Norman (1977) characterize language understanding as a form of perceptual processing in which physical information (print, sound, etc.) interacts with conceptual information (contextual cues, hypotheses, etc.) to produce a meaningful interpretation of an utterance. This notion is well documented in the literature. Research evidence suggests, moreover, that in the absence of contextual cues, the listener attempts to construct a context on the basis of the available linguistic cues (Bransford and Johnson, 1972). Adult native language listeners are usually able to construct such a context because of their extensive linguistic knowledge, and therefore, comprehension is seldom impeded. Second language listeners whose linguistic knowledge is at best very limited, however, probably find it difficult to construct a context from the often unfamiliar and incomplete linguistic cues. Therefore, if a context is either not given, or if, because of incomplete linguistic knowledge, the second language listener is unable to construct a context from the available linguistic cues, comprehension is almost certainly impeded.

According to Bransford and Johnson (1972), if any passage does not provide sufficient information about its context, the listener is in a problem-solving situation. Furthermore, their research suggests that complementing such material with a contextual visual substantially enhances comprehension. If it can be shown that contextual visuals have a similar potential for increasing the comprehensibility of second language listening material, the use of such visuals may be a pedagogical improvement over many current instructional practices.

Clearly, the degree to which certain non-linguistic cues are available and used in any listening situation varies with the nature of the material, the situation itself, and the listener. In most foreign language listening comprehension material, however, the non-linguistic elements are at best not sufficiently recognized for their important role, and at worst entirely ignored. Ducroquet (1977) attributes this to an "exaggerated interest in linguistics" (p. 251). In discussing listening comprehension tests, Ducroquet writes:

...it is now fairly usual to assume a standard format: recorded spoken material of a various nature (lists of words for aural discrimination, sentences, lectures, conversations, etc.), is played two or three times from a tape recorder, sometimes through earphones in a language lab, and the student has to answer a number of questions of the type used

in objective tests, i.e. multiple-choice, true-false, fill-in, etc. All of these tests produced (with the exception of some audio-visual material for young beginners) have one common characteristic: the material used is always heard and never seen (p. 251).

In her treatment of listening comprehension, Rivers (1975) reminds us of the complexity of this phenomenon and cautions teachers against "expecting students to extract and retain from foreign-language listening material more than they do in the native language" (p. 80). Not only are students often expected to "extract and retain" more, they are usually expected (or forced) to do so in an unnatural fashion. The nature of most foreign language listening material denies students the non-linguistic cues they use in native language comprehension. Thus, as Rivers (1975) points out:

...we may well be demanding more of our foreign-language listeners in the exercises we present than is demanded in native language listening (p. 62).

Providing students with relevant non-linguistic (contextual) cues may serve to make the listening exercises more realistic in that they will then more closely approximate native language listening comprehension.

Language (Listening Comprehension) and Context

A language comes to reality in contexts, situations, actual speech events, in wanting to say something, and in wanting to listen; it fits into a social setting, and it arouses feelings in the speaker and listener (Stern, 1973, p. 18).

To many language teachers, the ideas expressed above may seem so obvious as to be trite. Yet, the relationship among language, context, and meaning has been the focus of sharp linguistic controversies stemming largely from opposing views of language processing. Many linguists (including Chomsky) view language as a self-contained system whose meaning can be explained irrespective of the context in which the language is used. Others, however, maintain that language has no meaning in isolation--that language derives its meaning from contextual use. The dichotomous thinking on this matter is clearly illustrated by the following quotes from Oller (1973, p. 37).

...a sentence cannot have readings (i.e. meanings) in a context that it does not have in isolation (Katz and Fodor, 1963, p. 488).

...an utterance cannot have any meaning in isolation that it does not have in some context (Oller, 1973, p. 37).

Oller further maintains that "sentences have meanings because they are used in communication" (p. 37); he has proposed a "pragmatic theory of language" based upon the

study of relationships between linguistic elements and context.

Discussing language understanding from a perceptual processing point of view, Lindsay and Norman (1977) emphasize the importance of context in language understanding. They write:

The enormous amount of information that is accumulated and routinely used to understand events, we call the context of those events. We do not know exactly what mechanisms underlie the use of contextual information, but we do know that context plays a major role in our perceptions. It supplies the rules underlying the construction of our perceptual world, tells us what to expect, and gives plausible interpretations of what we are perceiving (p. 274).

Lindsay and Norman (1977) view language processing as a function of the combination of a data-driven mechanism that uses the physical cues and a conceptually driven mechanism which uses the contextual cues. The first mechanism is believed to operate from a "bottom-up" perspective in that it uses specific information (i.e. language symbols) to arrive at general meaning. The conceptually driven mechanism, on the other hand, operates from a "top-down" perspective in that general information is used to interpret the meaning of specific language elements.

Frederiksen (1975) characterizes the views of language processing into an interpretive and constructivist

model. The former represents language processing as "a more or less automatic parsing of each sentence in an input resulting in a semantic interpretation of the text" (p. 139). In the constructivist model, however, the input is selectively processed "using information selected from the current input sentence together with contextual information and stored knowledge about the world to generate a semantic interpretation which 'fits' the input 'data'" (p. 140). In Frederiksen's view, the constructivist model offers more powerful implications for explaining the processing of connected discourse.

Clark and Clark (1977) divide listening comprehension into two overlapping but identifiable processes: construction and utilization. In the first process, the listener constructs an interpretation of what was thought to have been said; in the second process, however, he uses the constructed message (interpretation) by reacting to what was thought to have been meant. It would seem reasonable to hypothesize that context plays an important role in both of these processes. Clark and Clark point out that a combination of syntactic and semantic cues is undoubtedly used in the construction process. Exactly when these different cues come into play and their exact contribution to the construction process, however, remain an enigma. Advocates of a semantic approach to explaining

comprehension hold that listeners use the context (semantic and pragmatic information) to build propositions that make sense, to parse the sentences into constituents accordingly, to anticipate constituents, and to look for noun phrases that refer to known entities. Despite the apparent lack of understanding of exactly how context affects comprehension, that it affects comprehension can hardly be denied.

The notion of comprehension being a process involving a complex interaction of input information, prior knowledge, and contextual cues is supported by various theories of language processing and by a rapidly growing corpus of empirically based research results (Bransford and Franks, 1971; Bransford, Barclay, and Franks, 1972; Bransford and Johnson, 1972, 1973; Sherman, 1975; Frederiksen, 1975; Clark and Clark, 1977; Lindsay and Norman, 1977). The underlying support for most of this research comes from text recall tests in which subjects are able to "recall" more information than was presented in the text. A logical question, therefore, is: Where does the conceptual and relational information not provided in the context come from if not from an interaction of input information, prior knowledge, and context?

On the basis of his experiment, Frederiksen (1975) concludes:

... the context in which a discourse occurs, when the context is related to what the subject does with the information he acquires from the discourse, can affect very significantly the semantic information which a subject incorporates into his memory structure for a text and hence his understanding of the text (p. 163).

Findings consistent with these have been reported by Bransford and associates (1971, 1972) and others. From their research, Bransford and Johnson (1972) concluded that contextual knowledge is not only important in information processing, but that in certain circumstances "relevant contextual knowledge is a prerequisite for comprehending prose passages" (p. 712). The experiments these authors conducted in 1972 were designed to manipulate prior knowledge to assess its influence on comprehension. The theoretical basis for those experiments was the authors' belief that subjects do not simply interpret and store the meanings of sentences, but rather, "create semantic products that are a joint function of input information and prior knowledge" (p. 718).

After having conducted extensive research on the comprehension process, Bransford and Johnson (1973) offer the following conclusions:

- 1) The subject's memory for a sentence or a set of sentences will be a function of how he uses what he knows to interpret what he hears, and, how he uses this interpretation to modify what he already knows (p. 428).

- 2) One may not be able to process linguistic inputs effectively without access to a substrata of additional information. Such prerequisite information may be obtained from non-linguistic experiences (e.g., visual inputs) as well as from prior sentences (p. 434).
- 3) ...context cues affected the degree to which hard sentences could be comprehended, and comprehension, in turn, affected the degree to which the individual sentences were learned and recalled (p. 405).

Sherman (1975) provides further empirical evidence supporting many of these notions. Using the findings reported by Bransford and Johnson (1973) as a base, he conducted a study to investigate further the relationship among context, prior knowledge, and input information. From this study, Sherman concludes:

...subjects when confronted with a prose learning task, actively: search for a context that the passage may be about, and then store the meaning or gist of the passage. It appears that comprehension does involve a complex interrelation between input information and prior knowledge, and that contextual knowledge enabling subjects to activate appropriate semantic information already in memory has profound facilitative effects (p. 3).

Pictorial Effects on Comprehension

While there has been a great deal of research conducted on various aspects of pictorial effects, the portion of that research devoted to pictures as aids to comprehension is relatively limited. Such research is virtually nonexistent in foreign language education. Thus, this section of the review of literature will deal primarily with native language research. Moreover, most of the research done in this area has been done with reading comprehension, and, although this study deals with listening comprehension, the findings of the reading comprehension studies are relevant from a standpoint of the implications they may have for human information processing and comprehension in general.

Omaggio (1977), in an initial effort to determine the effects of selected pictorials on measures of reading comprehension in French, reports findings that support the facilitative effects of certain types of pictures used as advance organizers. She also reports, however, that "all pictures were not equally effective in enhancing comprehension scores" (p. 99). The picture that seemed to have had the greatest impact on enhancing comprehension was the Prethematic Context Visual, which depicted a scene from the beginning of the story but peripheral to the central theme. Omaggio believes the

Prethematic Context Visual to have been the most helpful for one or more of the following reasons:

- 1) the picture was informative enough to contribute additional cues to the overall, general meaning of the reading passage without being confusing;
- 2) the picture depicted events from the beginning of the story, thereby aiding the reader in organizing his existing store of knowledge prior to reading the opening paragraphs;
- 3) the provision of a general context to the story helped students avoid making wrong or uncertain hypotheses about the events occurring in the passage; that is, the picture may have helped students guess the meaning of words or structures in the passage with which they were unfamiliar (p. 99).

Despite the inherent differences between reading and listening comprehension, the reasons cited in numbers two and three above seem to have direct implications for the present study because they are relevant to the comprehension process in general. Some of the findings from the Omaggio study were used to establish the criteria for defining contextual visual as the term is being used in this study.

From his excellent review of the effects of pictures on learning to read, comprehension, and attitudes, Samuels (1970) reports the following three conclusions:

- 1) The bulk of the research findings on the effects of pictures on acquisition

of sight vocabulary was that pictures interfere with learning to read.

- 2) There was almost unanimous agreement that pictures, when used as adjuncts to the printed text, do not facilitate comprehension.
- 3) In the few studies done on attitudes, the consensus was that pictures can influence attitudes.

Pressley (1977) writes, however, that "Research since 1970 clearly indicates that Samuel's conclusion must be modified" (p. 606). He supports this assertion by stating:

...there is suggestive evidence that experimenter-provided pictures aid young children's learning of prose. There is also a growing literature documenting that pictorial presentation and induced imagery of meaningful, connected materials may enhance the prose learning of populations who usually learn prose material poorly (p. 606).

It seems clear that very few general statements can be made regarding the effects of pictures on comprehension. While most of the earlier studies argue against the facilitative effects of pictures (Miller, 1938; Goodykoontz, 1936; Vernon, 1953, 1954), studies done more recently support an opposing view (Bransford and Johnson, 1972; Pressley, 1977; Rohwer and Miller, 1975). It seems appropriate to point out that in many of the earlier studies, less sophisticated research designs were employed, and the effects being tested were often

imprecisely defined. It is possible that the later studies were investigating some very specific effects of pictures and controlling for other variables rather than trying to assess the global effects of pictures on comprehension. It is this researcher's view that carefully controlled studies testing very specific effects of pictures will be more fruitful than the more generalizable global-effects studies.

The present study is being conducted to test the effects of visuals used as advance organizers in foreign language listening activities. While advance organizers are generally in the form of prose passages, visuals have also been used for this purpose. Weisberg (1970) compared visual and expository advance organizers in science lessons. He found that visual organizers functioned at a significant level while expository organizers did not. Sherman (1975) conducted a study to determine the effects of visual and verbal organizers on different types of material. He concluded: "subjects receiving pictorial organizers recalled significantly more words than did subjects in verbal organizer conditions" (p. 2). The Bransford and Johnson (1972) experiments discussed above clearly show the potential power of appropriate visual contextual organizers. While the primary purpose of these experiments was to test the effects of relevant contextual knowledge on listening comprehension measures,

the results support the efficacy of visuals as contextual organizers.

In summary, it can be said that very little definitive information regarding the effects of pictures on comprehension exists. It can also be said, however, that as studies move toward investigating more specific and limited aspects of pictorial effects on comprehension, the chances of understanding this relationship better will increase substantially.

Summary

The purpose of this review has been to report selected research related to advance organizers, context and comprehension, and the ability of pictures to provide context and affect comprehension. The conflicting research results on advance organizers may well be attributable to the problem of operationalizing this construct. Theoretically, the concept of advance organizers seems sound, and, under appropriate circumstances, advance organizers have been empirically shown to have facilitative effects on learning and comprehension. The multifaceted and highly complex language-processing phenomenon has yet to be fully understood. It has been empirically shown, however, that the context in which language operates has significant effects on processing and

comprehension. It has also been empirically shown that properly constructed and employed visuals facilitate comprehension possibly on the basis of their ability to provide a context in which linguistic material can be more meaningfully processed. Finally, while studies testing the global effects of pictures on comprehension have failed to support the facilitative effects of pictures, those studies designed to test more specific effects have opened some new areas of research on pictorial effects related to comprehension.

CHAPTER III

PROCEDURES

Population and Sample

The population from which sample subjects for this study were drawn consists of beginning German students at the United States Air Force Academy (USAFA), Colorado. The study was conducted in January 1979 while the students were enrolled in the second semester of a mandatory two-semester basic language sequence. The beginning German program at the USAFA is divided into a three-track system. Students are placed into one of these tracks on the basis of their scores on a comprehensive Placement/Validation Exam administered at the USAFA before the fall semester begins. Students who score low on the Placement/Validation Examination (below 30%) and students who had no German in high school are placed into the basic track

(G-131/132). Those students who have a background in German are placed into either the accelerated basic track (G-141/142) or the advanced basic track (G-141/142 Honors) on the basis of their level of proficiency in German.

This study was initially designed to observe the effects of a contextual visual on measures of listening comprehension in only one group of beginning German students (G-132). Because another group of beginning German students (G-142) became available for the study, the researcher decided to include the G-142 students because this would effectively increase the scope of the study. By using students who had little or no background in German and students who had from four to six semesters of high school German, it became possible to compare the pattern of results for the effects of a contextual visual in two levels of beginning German instruction. Thus, the research in effect included two experiments.

Nine (9) sections (intact classes) of G-132 were used for Experiment I, and six (6) sections of G-142 were used for Experiment II. Twenty-eight percent (28%) of the G-132 students had studied some German in high school, while the remaining 72% had no high school German training. All of the G-142 students had a background in high school German, and they had scored between 31% and 55% on the Placement/Validation Examination.

USAFA students were selected as the population for this study for a number of reasons. First, this group of language learners is of most immediate interest to the researcher. Second, the facilities at USAFA (classrooms, equipment, etc.) are more uniform than those at many educational institutions. This serves to increase the internal validity of the study; laboratory-like conditions are available for a study being conducted in the natural classroom environment. The fact that the study was conducted as part of regular class activity increases the external validity of the study and, in turn, allows one to generalize the study's findings to actual instructional settings. Third, the language courses at the USAFA are administered with a high degree of standardization; to the extent possible, all students enrolled in a particular course receive the same instruction. Materials, class activities, study requirements, tests, and general teaching strategies are all standard. In an effort to equalize the instructor factor, instructors change classes at mid-semester so that each class has the benefit of working with two different instructors. In short, the USAFA setting offered a greater degree of internal validity for the study without simultaneously compromising the external validity.

The student body at the USAFA is unique because it is over 90% male and because it is drawn proportionately

from all fifty states. Because all three service academies (USAFA, West Point, Naval Academy) draw their students from essentially the same high school population with regard to academic and personality profiles, the results of this study may be cautiously generalized to the other two service academies. Generalizing the results of this study to other populations of beginning college language learners is limited by the degree to which the USAFA students differ from other college populations on factors relevant to language learning.

Because this study was intentionally designed to be consistent with ongoing instruction in beginning German at the USAFA, intact classes were randomly selected and randomly assigned to the experimental conditions. The nine sample groups of G-132 students yielded an $N=123$ for Experiment I, while the six groups of G-142 students yielded an $N=76$ for Experiment II. Class size ranged from 12 to 15 for all classes with the G-142 classes averaging slightly smaller n 's than the G-132 classes.

It is important to point out that procedurally, Experiment II was an exact replication of Experiment I. The experiments did differ, however, with respect to sample size ($N=123$ vs $N=76$) and in the fact that the subjects in Experiment II (G-142) were more proficient beginning German students.

Design

A One-Between--One-Within-Groups Partial Hierarchical Design (Kennedy, 1977) was selected for this study because this design offers the efficiency and high information yield of a factorial design, while also controlling for other potentially confounding variables. More specifically, because this study dealt with intact classrooms, it was considered important to determine how much of the total variance in the visual variable could be attributed to the classroom effect. With this design, the unique effects of classrooms can be statistically estimated and controlled; therefore, the design allows for the comparison of the average impact of the levels of the visual variable across two levels of aptitude, independent of the potentially confounding influences of classrooms. Furthermore, this design has the potential of identifying any significant interactions between levels of the visual variable and levels of the aptitude variable.

This study has the following three independent variables:

- 1) Availability of the Contextual Visual (A).
- 2) Classrooms (Nested w/in Levels of the Visual Variable (B/A).
- 3) Aptitude for College German (C).

The first independent variable is a fixed, active variable with the following three levels:

- 1) Visual Before (A_1): Subjects see the contextual visual before hearing the listening passage and recalling its contents in a written summary.
- 2) Visual After (A_2): Subjects listen to the listening passage, see the contextual visual, and then recall the contents of the passage in a written summary.
- 3) No Visual (A_3): Subjects listen to the passage, write a summary of its contents, but do not see the contextual visual.

The second independent variable (B=Classrooms) is a random variable nested within levels of the availability of the contextual visual variable. The classroom variable has nine (9) levels or intact classes six (6) in Experiment II). Three classrooms were randomly assigned to each level of the visual variable (two classes in each level of the visual variable for Experiment II). (See design diagrams below.) The third independent variable (C=Aptitude) is a fixed, blocking variable with two levels: High and Low. This variable was included in order to determine if there were any Aptitude Treatment Interactions (ATI). The students' prior achievement (grades) in the immediately preceding college German course was used as

an index of aptitude for learning college-level German. Each class was rank ordered on the basis of G-131 (G-141 in Experiment II) final grades. These distributions were then divided in half at the median score. In cases where there was an odd number of scores, the odd score was grouped with the set of scores (high or low) to which it was closer.

The prior achievement scores were used as an index of aptitude because prior achievement has been shown to be the most precise and consistent predictor of success in language learning. These scores, moreover, were readily available to the researcher, making it unnecessary to administer a separate aptitude test.

This study has one dependent variable--a free-recall summary of the listening passage written during seven minutes immediately following the experimental conditions. Subjects were asked to write a summary of the listening passage they heard, and, simply, to include as much information as time would permit. The summaries were scored on the basis of the number of valid semantic propositions they contained. A valid proposition is a fact, piece of information, or logical inference made on the basis of the information heard in the passage. In order to control the subjectivity inherent in scoring free-recall material, an a priori list of all possible propositions based upon the taped passage was developed before the experiment was

conducted. This list was validated by a jury of seven German teachers to ensure that all possible propositions had been included on the list. The students' summaries were scored giving one point for each valid proposition in the summary for which a corresponding proposition appeared on the designated list. The valid propositions were then summed into one score which became the index of listening comprehension recall used as the criterion measure (dependent variable) for the data analysis.

A listing of the relevant variables with designators corresponding to those in the design diagram on the next page follows:

Factor

A	Fixed; Between Levels of E
B	Random; Nested Within Levels of A.
C	Fixed; Within Levels of B
D (Subjects)	Random; Nested Within BC/A Combinations.

<u>Availability of</u> <u>Contextual Visual</u> (A)	<u>Classrooms</u> (B)	<u>Aptitude</u>	
		<u>High</u> (C ₁)	<u>Low</u> (C ₂)
Visual Before (A ₁)	$\begin{bmatrix} -B_1 \\ B_2 \\ -B_3 \end{bmatrix}$		
Visual After (A ₂)	$\begin{bmatrix} -B_4 \\ B_5 \\ -B_6 \end{bmatrix}$		
No Visual (A ₃)	$\begin{bmatrix} -B_7 \\ B_8 \\ -B_9 \end{bmatrix}$		

Figure 1. Experimental Design for Experiment I.
One-Between--One-Within-Groups Partial
Hierarchical Design.

The design diagram for Experiment II (see below) clearly shows that the experiments were identical except for the number of classes used in each case. This difference is manifest in the number of levels in the Classroom Variable (B). A detailed description of how the classes were assigned to the different experimental conditions follows. Because exactly the same procedures were used in both experiments, only Experiment I will be discussed in detail in the following section. Where appropriate, important differences between the two experiments are noted.

<u>Availability of</u> <u>Contextual Visual</u>	<u>Classrooms</u>	<u>Aptitude</u>	
		<u>High</u>	<u>Low</u>
(A)	(B)	(C ₁)	(C ₂)
Visual Before (A ₁)	[-B ₁ -B ₂		
Visual After (A ₂)	[-B ₃ -B ₄		
No Visual (A ₃)	[-B ₅ -B ₆		

Figure 2. Experimental Design for Experiment II.

Instrumentation and General Procedures

This study was conducted at the USAFA between the 16th and 19th of January 1979. The researcher had established preliminary contact with the USAFA German instructors in October 1978 at which time the instructors were briefed on the general procedures to be followed in conducting this experiment. At that time, it was decided to reserve a 20-minute block of time specifically for this experiment. This block of time was identified in the students' study guide as "Listening Comprehension Exercise," but no mention was made of this exercise being anything different from the normal exercises until the day of the experiment.

Subjects were assigned to experimental conditions as follows:

- 1) The class rosters of the ten sections of G-132 were numbered one through ten. Using a random numbers table, the researcher selected the nine sections to be used for the study.
- 2) The nine sections were then randomly assigned to three groups.
- 3) The three groups of intact classes were then randomly assigned to one of the three experimental conditions: Visual Before, Visual After, No Visual.

The class rosters were then identified with designators A_1 , A_2 , or A_3 , and the designators B_1 through B_9 . This information was entered onto a master copy of the design diagram.

The class rosters contained a six-digit cadet number for each student. This number, preceded by the designator B_1 through B_9 , was written on the back of the papers on which the students would write their summaries. Thus, each student's paper was identified with the student's specific number and with the level of the "B" variable (classroom). The researcher distributed and collected all papers. As a final check on ensuring that each student had the correct paper, the researcher asked the students to verify their cadet numbers on the papers. This was done after all writing had stopped and immediately before the papers were collected. No problems were encountered.

Testing Facilities and Materials

All foreign language classrooms at the USAFA are equipped with sixteen individual cassette tape recorders. These recorders are standard with regard to features, age, and state of repair. Although the recorders are periodically checked by trained technicians assigned to the Foreign Language Department, the researcher personally tested the recorders on the days of

the experiments. The experiments were conducted in three identical classrooms, each of which was equipped with an overhead projector and a white wall designed to be used as a viewing screen. For the visual groups, the contextual visual was projected onto the viewing screen from an overhead projector spaced equidistant from the screen in all three classrooms.

The recording systems in the classrooms are designed to allow taped material to be broadcast into the room from one master recorder, or to each individual student via the headsets. The headset mode was used for the experiments so that sources of extraneous noise or distraction could be minimized, and so that all students would be able to hear the tape equally well with regard to loudness, room acoustics, and distance from the source. Because all recorders are the same and because all students heard the tape from one master source, there is a relatively high degree of control over extraneous variables, which, in turn, strengthens the internal validity of the study. Administering the tests in the natural classroom environment, on the other hand, increases the external validity of the study and allows one to generalize the findings to actual classroom situations.

Because this study was designed to be consistent with ongoing instruction in beginning German at the UFAPA, the test materials (taped passage) were based upon course

content. (The G-132 and G-142 courses use the same textbook, Deutsch Heute by Moeller and Liedloff, although they deal with the material with varying speeds and degrees of depth.) The passage used in these experiments was selected on the basis of its content (topic and vocabulary), level of difficulty, and degree of authenticity. The passage is an adaptation of an on-the-scene interview that is part of the audio-visual language program, So Sind Die Deutschen, published by EMC Corporation. The passage was adapted for use in this study with written permission of the publisher.

The criteria used to select a passage for this study were as follows:

- 1) Authentic use of language.
- 2) Material (content and language) appropriate for beginning foreign language listening practice.
- 3) Material that would be suitable for listening comprehension without the use of a visual

It is important to point out that the passage used in this study was judged comprehensible without the accompanying picture. As stated in Chapter I, the purpose of the picture is to augment the listening process, and not to "solve" a riddle presented in the taped text. The passage selected met all of these criteria and happened

to be in an interview format. The researcher realizes that the interview format is only one of many possible formats for testing listening comprehension. In fact, this study should be replicated using other formats to determine whether or not they produce the same results.

After the passage was selected by the researcher, it was validated by a jury of five college German professors. The passage was validated from several perspectives:

- 1) Authenticity of the language.
- 2) Difficulty level.
- 3) Appropriateness for listening comprehension.

The jury of professors who validated the passage included Professor Werner Haas, a senior professor of German at the Ohio State University and an experienced textbook author, three associate professors of German at the USAFA, all of whom hold Ph.D. degrees, and a German Air Force exchange officer.

The passage was taped at the USAFA recording facilities two days before the experiments were conducted. Three native German speakers recorded the tape under the researcher's direction. The passage was recorded several times, and the best print of the tape was then selected for the master recording. Because the actual time spent looking at the picture or writing the transcript was a

crucial factor, all instructions and times were kept standard by the test tape. (See copies of tape scripts in Appendix B.) The three test tapes differed only in the specific instructions regarding the visual (before or after). All three experimental groups heard exactly the same test passage because the three test tapes were made simultaneously from one master recording using a high-speed cassette duplicator. Brand new cassettes were used to make the master copy and the three test tapes to ensure a high-quality recording.

The taped instructions told the students exactly when to begin listening to the passage, when to begin writing their summaries, and when to stop writing. In order to isolate the main independent variable as much as possible, the taped passage was played only once. Because this is a departure from the normal listening comprehension exercises in which the students hear the tape twice, care was taken to ensure that all students understood that they would hear the passage only once. Immediately before the passage began, students were reminded (on the tape) that they would hear the passage only once.

Foreign language classes at the USATA are scheduled on an every-other-day basis. G-132 classes meet for two fifty-minute periods separated by a ten-minute break, while the G-141 classes meet for only one fifty-minute

period, but also every other day. In the G-132 classes, the experiment was conducted during the first twenty minutes of the second period. In the G-142 classes, the experiment was conducted during the first twenty minutes of the period.

Before the experiment began, the researcher introduced himself, explained that the experiment was part of a doctoral dissertation, and asked for the students' cooperation. Nothing else was said by either the researcher or the classroom instructor except the administrative instructions. Test papers were distributed, and students were asked to read the instructions on the cover sheet. Students were then told that the instructions would be repeated on the tape and that they were to raise their hand if they were unable to hear the instructions clearly. (This was done as a final check of the equipment.) After the students put their headsets on, the tape was begun. The tape ran for 13 minutes after which time the papers were collected.

Pilot Study

The administration procedures and materials discussed above were tested in a pilot study conducted in German 102 classes at The Ohio State University during the 1978 Autumn Quarter. No procedural problems were encountered, and the materials (tape and page) required

only minor modifications. As a result of the pilot study, it became necessary, however, to modify the original experimental design, which had attempted to observe the effects of a visual across two levels of passage difficulty. The difficulty level varied with regard to vocabulary, sentence, and length of the passage. Because the number of propositions one could write from the two passages varied, it was impossible to analyze the two sets of scores (difficult passage scores and easy passage scores) in the ANOVA procedure. The incomparability of the scores precluded testing for interaction in an ANOVA procedure. In view of this limitation, it was decided to modify the design of the study to increase the information yield and the value of the findings. A detailed description of the pilot study can be found in Appendix A.

Scoring Procedure

As stated above, the papers were scored on the basis of the number of valid propositions contained in the summaries. Scoring validity was established by giving credit for only those propositions which corresponded to one of the propositions on the a priori designated list of propositions. The list of propositions (see Appendix B) was developed by the researcher and later validated by five other persons in order to ensure that all reasonable

propositions had been included on the list.

In order to avoid scoring biases, the papers were not identified with respect to the experimental condition, except for the control number on the back. Thus, while scoring the papers, the scorer did not know to which experimental group the paper belonged. The researcher scored all papers after an interscorer reliability of .96 was established. Scoring reliability was established as follows:

- 1) The researcher trained another person in scoring procedures for 30 minutes, pointing out what constituted a valid proposition on the basis of the list of propositions. Some interpretation is necessary in this type of scoring because rarely are all propositions on the student papers worded exactly the same as those on the designated list.
- 2) The researcher and the second scorer then independently scored a randomly selected sample of 35 papers and recorded these scores.
- 3) The two independently obtained sets of scores were then correlated to produce a correlation coefficient of .96.

Analysis of the two sets of scores revealed total agreement on 50% of the papers. The other 50% differed by one or two points, but always in favor of the researcher. It was decided that, in most cases, the source of the discrepancies was not a matter of procedure or interpretation, but rather a matter of varying degrees of familiarity with the material. The second scorer often failed to give credit for a valid proposition simply because he was unable to identify readily the corresponding proposition on the list. Had there been a longer training period, the scoring reliability would probably have been even higher.

Statistical Analysis

The data obtained from the students' summaries were subjected to a univariate analysis of variance (ANOVA) to test the hypotheses of no difference between groups. An existing, packaged data analysis program (SOUPAC) was used to analyze the data on an IEM 370 computer at the Instruction and Research Computer Center at The Ohio State University. The following null hypotheses were tested:

- H_{01} : There will be no significant differences attributable to variation in the availability of a contextual visual variable on recall measures

of listening comprehension.

H_{02} : There will be no significant differences attributable to variation in the aptitude variable on recall measures of listening comprehension.

H_{03} : There will be no significant differences attributable to variation in the classroom variable on recall measures of listening comprehension.

H_{04} : There will be no significant interactions between levels of the availability of a contextual visual variable and levels of the aptitude variable.

CHAPTER IV

RESULTS AND DISCUSSION

Introduction

A One-Between--One-Within-Groups Partial Hierarchical Design (Kennedy, 1977) was used in each of the two experiments conducted for this study. This design was selected primarily because the study dealt with intact classrooms. The purpose of the study was to observe the effects of a contextual visual on recall measures of listening comprehension across two levels of aptitude in beginning college German. The three levels of the contextual visual variable are as follows:

- 1) Visual Before: Subjects saw the contextual visual before hearing the listening passage and recalling its contents in a written summary.

2) Visual After: Subjects saw the contextual visual after having heard the listening comprehension passage but before recalling its contents in a written summary.

3) No Visual: Subjects heard a listening comprehension passage and wrote a summary of its contents, but did not see the contextual visual.

The levels of the aptitude variable (High and Low) were based upon an index of the degree of success the students had achieved in the immediately preceding college course. (See Chapter III for a complete description of the independent variables.)

The criterion measure used in this study consisted of the dependent variable--the total number of valid propositions students were able to recall from the passage and write into their summaries. Criteria for determining acceptability of valid propositions are found in Appendix B. Interrater reliability for the criterion measure was found to be .96.

A one-way analysis of variance was conducted on each set of data (G-132 = Experiment I, G-142 = Experiment II). The analysis was conducted using the BALANOVA 5 statistical package of the SOFAC program developed

by the Computing Services Office at the University of Illinois. This program was selected for the analysis because it is particularly well suited for mixed or hierarchical designs and because it is compatible with unequal cell sizes (n 's). Although this study was designed to keep the cell sizes standard, the use of intact classrooms made this impossible in some cases. As a result of the unequal n 's, the BALANOVA 5 Program performed an unweighted means analysis on the data. The unweighted means method is an approximation of the least squares solution to the analysis of variance. This method results from the combination of calculating a one-measure-per-cell ANOVA and an error variance apart from the analysis on cell means. The program automatically determines all of the legal sources of variance (main-effects and interactions) and determines the correct denominator mean square for those sources which can then be tested by an F -test.

Findings

The results of the data analysis and the findings as they relate to the four null hypotheses tested are presented in this section. Each null hypothesis will be examined in light of the two sets of data (G-132 and G-142). Table 1 provides a summary of the results for the two experiments.

Table 1. Main-Effect Means and Standard Deviations
for the Visual Variable.

		<u>G-132</u>	<u>G-142</u>
	(n)	(44)	(25)
Visual Before (A ₁)	\bar{X}	9.78	14.37
	S.D.	4.32	4.52
	(n)	(40)	(24)
Visual After (A ₂)	\bar{X}	7.96	11.67
	S.D.	5.21	4.20
	(n)	(39)	(27)
No Visual (A ₃)	\bar{X}	5.25	11.50
	S.D.	3.06	6.26

Hypothesis I: There is no significant difference attributable to variation in the availability of a contextual visual variable on recall measures of listening comprehension.

G-132 (Experiment I)

This hypothesis must be rejected for the G-132 students. It can be seen from Table 2 that the means of all three groups differ. Examination of the analysis of variance reveals, moreover, an F-ratio significant at the .001 level (Table 3). To investigate further the significant F-ratio for the visual variable, post hoc multiple comparisons using the Scheffé Method were conducted. The Scheffé Method was selected for the post hoc tests because it is compatible with unequal cell-sizes (n's) and because it allows the researcher to conduct all possible comparisons without escalating the alpha error. Results of the post hoc comparisons reveal significant mean differences at or beyond the .05 level between all three treatment groups. The difference between the means of the Visual-Before groups and the No-Visual (control) groups ($9.78 - 5.25 = 4.53$) is significant at the .001 level, while the difference between the means of the Visual-Before groups and the Visual-After groups ($9.78 - 7.96 = 1.82$) is significant at the .05 level. The Visual-After groups also scored significantly higher than

Table 2. Cell Means and Standard Deviations for G-132.

Availability of Contextual Visual	Classrooms	A p t i t u d e			Classroom Totals	Visual Totals
		\bar{X} S.D.	High 11.86 2.54	Low 7.14 4.06		
<u>Visual Before</u>	1				9.50 4.07	
	2	\bar{X} S.D.	10.57 1.62	8.75 5.60	9.66 4.20	\bar{X} S.D. ⁴⁴ 9.78 4.32
	3	\bar{X} S.D.	13.00 4.65	7.38 3.54	10.20 4.90	
<u>Visual After</u>	4	\bar{X} S.D.	9.71 5.85	5.28 2.50	7.50 4.90	
	5	\bar{X} S.D.	9.57 4.79	6.43 2.82	8.00 4.11	\bar{X} S.D. ⁴⁰ 7.96 5.21
	6	\bar{X} S.D.	13.17 7.03	3.67 1.03	8.42 6.89	
<u>No Visual</u>	7	\bar{X} S.D.	7.71 2.98	2.28 1.25	5.00 3.57	
	8	\bar{X} S.D.	7.33 3.14	4.86 2.54	6.19 3.00	\bar{X} S.D. ³⁹ 5.25 3.06
	9	\bar{X} S.D.	5.83 2.32	3.50 2.26	4.67 2.50	

Table 3. Summary Table for One-Way Analysis of Variance for G-132

Source	df	SS	MS	F
<u>Between Classrooms</u>				
Visual Variable (A)	2	422.77	211.38	52.04***
Classrooms w/in Levels of Visual Variable (B/A)	6	24.37	4.06	.29
<u>Within Classrooms</u>				
Aptitude (C)	1	581.51	581.51	28.38**
A x C	2	28.06	14.03	.68
B x C w/in A	6	124.04	20.67	1.47
Subjects w/in B x C w/in A	104	1474.50	14.18	
Totals	121			

* $p < .05$
 ** $p < .01$
 *** $p < .001$

the No-Visual (control) groups. In this case, the means differed by 2.71 ($7.96 - 5.25 = 2.71$), which is significant at the .01 level.

Table 2 reveals a relatively stable pattern of results for the G-132 groups. In all cases, the Visual-Before groups scored highest, while the No-Visual (control) groups scored lowest. As the lack of a significant interaction between the visual variable and the aptitude variable indicates, the pattern of results remains stable across the two levels of aptitude.

G-142 (Experiment II)

The null hypothesis of no significant differences between levels of the visual variable must remain tenable for the G-142 students. Although there are differences in the means of the three groups (see Table 4), these differences are not significant. As the G-142 ANOVA Summary Table (Table 5) indicates, there were no significant F -ratios for the visual variable. Despite the lack of an overall significant difference between the means of the three groups, it can be seen from Table 4 that the Visual-Before groups scored higher than the other two groups. Closer inspection of this table reveals, moreover, that the general pattern produced in the G-132 groups does not seem to be present here.

Table 4. Cell Means and Standard Deviations for G-142

Availability of Contextual Visual	Classrooms	A p p r o p r i a t e		Classroom Totals	Visual Totals
		High	Low		
<u>Visual Before</u>	1	n \bar{X} S.D.	6 15.00 4.15	12 15.67 4.46	n 25 \bar{X} 14.37 S.D. 4.52
	2	n \bar{X} S.D.	6 11.00 4.29	13 13.07 4.42	
<u>Visual After</u>	3	n \bar{X} S.D.	6 9.00 1.67	12 9.17 2.55	n 24 \bar{X} 11.67 S.D. 4.20
	4	n \bar{X} S.D.	6 12.00 2.75	12 14.17 4.09	
<u>No Visual</u>		n \bar{X} S.D.	6 9.14 5.34	13 11.21 6.87	n 27 \bar{X} 11.50 S.D. 6.26
		n \bar{X} S.D.	7 10.57 6.19	13 11.78 5.81	

Table 5. Summary Table for One-Way Analysis of Variance for G-142

<u>Source</u>	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>
<u>Between Classrooms</u>	<u>2</u>			
Visual Variable (A)	2	130.72	65.36	.97
Classrooms w/in Levels of Visual Variable (B/A)	3	201.99	67.33	2.81*
<u>Within Classrooms</u>	<u>70</u>			
Aptitude (C)	1	146.67	146.67	10.41*
A x C	2	2.88	1.44	.10
B x C w/in A	3	42.26	14.09	.59
Subjects w/in B x C w/in A	64	1530.86	23.92	
<u>Totals</u>	<u>75</u>			

*p < .05

For example, there is very little difference in the means of the Visual-After and No-Visual groups. Also, the pattern of results with regard to the individual classrooms is not so regular.

Hypothesis II: There is no significant difference attributable to the variation in the aptitude variable on recall measures of listening comprehension.

G-132 (Experiment I)

This hypothesis must be rejected for the German 132 students. The F -ratio produced for this variable is significant at the .01 level. Examination of the table of cell means reveals, moreover, that the pattern of results was highly consistent. Without exception, the high-aptitude students scored better than the low-aptitude students in every class. This finding is not surprising; in fact, were this not the case, one would have to question the value of the aptitude measure used.

G-142 (Experiment II)

This hypothesis must also be rejected for the German 142 students because the F -ratio produced for this variable (Table 5) is significant at the .05 level. Although the difference between the high-aptitude groups and the low-aptitude groups of G-142 students is often not as great as it was for the G-132 students, the

general pattern does seem to remain stable. Table 6 summarizes the results on the aptitude variable for both experiments. It appears that the visual was to a greater extent superfluous for the G-142 students because the difference between the No-Visual and Visual groups is very small for both high- and low-aptitude groups.

Hypothesis III: There are no significant differences attributable to the variation in the classroom variable on recall measures of listening comprehension.

G-132 (Experiment I)

This hypothesis must remain tenable for the G-132 students in view of the non-significant F -ratio for this variable. Clearly, very little of the total variance in the scores can be attributed to the classroom variable. While this finding is not surprising, it does strengthen the findings for the visual variable because one additional source of error (classrooms) has been statistically controlled, thereby reducing the amount of random error. Examination of the table of cell means and standard deviations reveals that the three classrooms in each experimental condition vary only slightly. There is less than a 1.5 point spread, for example, between any two classes in each of the three conditions.

Table 6. Main-Effect Means and Standard Deviations
for Aptitude Variable.

		<u>G-132</u>		<u>G-142</u>	
<u>Visual Before</u>	High	n	21	12	
		\bar{X}	11.81	15.73	
	S.D.	3.20	4.14		
		Low	n	23	13
\bar{X}	7.75		13.00		
S.D.	4.36		4.87		
<hr/>					
<u>Visual After</u>	High	n	20	12	
		\bar{X}	10.82	12.83	
	S.D.	5.81	5.17		
		Low	n	20	12
\bar{X}	5.13		10.50		
S.D.	2.46		2.68		
<hr/>					
<u>No Visual</u>	High	n	19	13	
		\bar{X}	6.96	13.15	
	S.D.	2.81	6.71		
		Low	n	20	14
\bar{X}	3.55		9.86		
S.D.	2.26		5.60		
<hr/>					
<u>Totals</u>		<u>High</u>	<u>Low</u>	<u>High</u>	<u>Low</u>
	n	60	63	37	39
	\bar{X}	9.86	5.47	13.90	11.12
	S.D.	4.58	3.65	5.43	4.81

G-142 (Experiment II)

In view of the different results produced by the G-142 data, this hypothesis must be rejected for this group. The F-ratio for the classroom variable is significant at the .05 level. Table 4 shows, moreover, that, in two out of the three experimental conditions, the classrooms vary by far more than did those in the G-132 groups. These findings point to the importance of controlling for the classroom effect whenever intact classes are used in experimental research. It can be seen from these results that the classroom effect can be a confounding factor even though random selection and assignment were employed in the design.

Hypothesis IV: There are no significant interactions between levels of the visual variable and levels of the aptitude variable on recall measures of listening comprehension.

G-132 (Experiment I) and G-142 (Experiment II)

This hypothesis must remain tenable for both sets of data. The analysis of variance failed to produce a significant F-ratio for interaction in both the G-132 and the G-142 groups.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Overview

The primary purpose of this study was to investigate the effects of a contextual visual on recall measures of listening comprehension. The effects of the contextual visual were studied in terms of the number of valid semantic propositions subjects were able to recall and write in a summary of the listening passage. Also of interest in this study, was whether or not the effects of the visual interacted with aptitude, and whether or not varying the locus of the visual (before or after the listening passage) produced varying effects on recall measures of listening comprehension.

The study was conducted using two levels of beginning college German instruction to determine whether or

not any effects of the visual remained constant across two levels of proficiency in beginning college German. Two experiments were conducted for this study: Experiment I used G-132 students (N=123) and Experiment II used G-142 students (N=76). The two groups of students are assumed to differ only with respect to their relative proficiency in beginning college German with the G-142 students being the more proficient.

A One-Between--One-Within-Groups Partial Hierarchical Design was used in each of the two experiments in this study. Nine (9) intact classes of G-132 (N=123) served as subjects for Experiment I, and six (6) intact classes of G-142 (N=76) served as subjects for Experiment II. The three experimental conditions in this study were as follows:

- 1) Visual Before: Subjects saw the contextual visual before hearing the listening passage and recalling its contents in a written summary.
- 2) Visual After: Subjects saw the contextual visual after having heard the listening passage, but before recalling its contents in a written summary.
- 3) No Visual: Subjects heard the listening passage, recalled its contents

in a written summary, but did not see the contextual visual.

After the subjects had heard the listening passage and seen the visual (where appropriate), they were given seven minutes to write a summary of the passage. The students were instructed to include as much information as time would permit. (See instructions to students in Appendix B.) The students' summaries were then scored on the basis of the number of valid propositions they contained. (See Appendix B for the list of valid propositions.) The two sets of data obtained (Experiment I/G-132 and Experiment II/G-142) were submitted to separate one-way analyses of variance.

Summary of Findings

A review of the findings reveals significant differences between experimental-group means at or beyond the .05 level for the less-proficient G-132 students. For these groups, both the Visual-Before and the Visual-After groups scored significantly higher than did the No-Visual (control) groups. When the experiment was replicated with the more-proficient G-142 students, however, there were no significant differences between experimental-group means. Despite the lack of a significant difference for the G-142 groups, the pattern

of results was similar for both experiments.

A summary of the findings with regard to the four research questions investigated follows.

Question I: What are the effects of a contextual visual on recall measures of listening comprehension?

This research question was the primary focus of the study. The data obtained from the two experiments suggest that the extent to which a contextual visual can be expected to enhance listening comprehension is, at least in part, a function of the listener's degree of language proficiency. In short, for the less-proficient G-132 students, a contextual visual seemed to increase substantially their ability to recall semantic propositions from the passage. For these students, moreover, seeing the visual before hearing the passage seems to have had the most impact. Replications of the experiment with more-proficient students (G-142) produced slightly different results. It seems that the contextual visual made less of a difference for the G-142 students, although the Visual-Before groups scored higher (not significantly higher) than the other two groups.

Some comments regarding the hypothesized function of contextual visuals seem relevant here. The reader

will recall from Chapter I that the visual was hypothesized to aid comprehension to the extent that it can provide relevant contextual information which is not readily apparent from the linguistic cues. The listener's ability to "construct" a context from the linguistic cues seems, moreover, to be a function of his degree of familiarity with the to-be-comprehended material. In a foreign language situation, it is readily apparent that the listener's fluency in the language is a crucial factor. Thus, it seems reasonable to suggest that, in a foreign language listening situation, the effects of a contextual visual are inversely related to the listener's proficiency in the language. In sum, the contextual visual can be expected to aid comprehension to the extent that it provides information which would otherwise be denied to the listener. On the other hand, the contextual visual seems superfluous to the extent that the listener is able to glean a context from the linguistic cues.

Question II: What are the effects of varying the locus of a contextual visual in the sequence of events on recall measures of listening comprehension?

This question was investigated to sharpen the focus on the "process-oriented" versus "content-oriented" distinction of advance organizers. Simply stated, if the visual were a conveyor of content information, where it appears in the sequence would be of little consequence. One could argue, in fact, that if the visual did provide content information, the subjects who saw the visual after having heard the passage could be expected to do better and recall more because of a "recency effect." The most compelling evidence arguing for a "process-oriented" function for the contextual visual comes from the G-142 experiment. If, for example, the visual provided content information, one would expect those subjects who saw the visual to have a decided advantage over those who did not see the visual simply because they have more information on which to base their summaries. This did not seem to be the case.

It is interesting that, although the Visual-Before groups (G-132) did best of all, the Visual-After groups also did better than the control groups. If one is inclined to rule out the "content-oriented" function of the visual, it seems reasonable to suggest that, while not as effective as seeing the visual before hearing the passage, seeing the visual after having heard the

passage also allows one to retrieve cues from stored memory. In this case, the visual cues may serve to answer some questions which the subject was unable to answer in his own mind on the basis of the linguistic cues. In other words, the "so-that's-what-was-meant" phenomenon may be operating in the case of the Visual-After groups. Thus, it seems reasonable to suggest that these cues help the listener "piece together" information he receives from the linguistic cues and from his store of knowledge to "construct" a context for the material he heard.

To answer this research question, one could suggest that the locus of the visual affects the listening process simply because the information from memory is retrieved at different times. While seeing the visual before hearing the passage seems to have been the most effective treatment in this study, the fact that the Visual-After groups also scored higher than the No-Visual groups points to some interesting implications. For example, it seems reasonable to suggest that seeing the visual before and after hearing the passage may produce different results. One may ask, moreover, whether or not seeing the visual and hearing the passage simultaneously would affect the outcome of comprehension. Clearly, more research must be done with regard to identifying

the most productive combinations of visuals and listening comprehension material.

Question III: Do the effects of a contextual visual vary with the students' aptitude as measured by prior achievement in language learning?

The data from this study suggest that the effects of a contextual visual remain constant across different levels of aptitude. Replications of this study using different materials and different aptitude measures may, however, provide a more complete answer to this question.

Question IV: Are there any significant interactions between aptitude (prior achievement) and availability of a contextual visual?

There seems to be no interaction between these two variables in the present study. It should be pointed out, however, that the population investigated in the present study (USAFA students) may not vary as much in terms of aptitude as do students in other college populations. Replications of this study with other college populations may provide a different view on the aptitude

variable.

In summary, the study reveals that appropriate contextual visuals can enhance listening comprehension recall for beginning college German students. The study points out, moreover, that the effects of such visuals are closely related to the students' level of proficiency in the language. In the case of those students for whom a contextual visual appears to enhance listening comprehension, seeing the visual before hearing the passage seems to result in the greatest amount of listening comprehension recall. The Visual-Before treatment is believed to have been the most effective for one or more of the following reasons:

- 1) the visual serves as an advance organizer, which activates relevant elements of stored memory, and brings them to bear on the comprehension process;
- 2) in seeing the overall context first, students were less likely to formulate wrong hypotheses and, consequently, better able to guess the meaning of unfamiliar words and phrases;
- 3) seeing the visual before hearing the passage heightened the students' interest and caused them to pay closer attention to the passage.

Limitations of the Study

The following limitations should be kept in mind when considering the results of this study:

- 1) Listening Passage Text: Only one passage was used in this study. Because listening material differs widely, the findings of this study can be generalized only to other passages of a similar nature and difficulty level. The passage used was in an interview format, moreover, and without further research, it is difficult to determine whether or not the format affects the outcome.
- 2) Contextual Visual: The operational definition of a contextual visual (Chapter I) was used as the basis for designing the visual used in this study. Because visuals vary widely with regard to composition, quality, and purpose, it is difficult to generalize the results of this study to other types of visual aids. It must also be pointed out that the visual effects observed in this study resulted from combining this particular

visual with a particular passage, and it is difficult, therefore, to determine to what extent the results of the study are selection specific.

- 3) Instrument: Only the "recall" component of listening comprehension was measured in this study. Measuring other components of this complex construct may produce different results. The instrument used in this study (free-recall summary) also has some unique limitations. There are, for example, several factors besides listening comprehension being measured by a free-recall summary. The student's willingness and ability to express himself in writing is perhaps one of the most crucial factors. In short, while a proposition-filled summary is probably a good measure of comprehension, it is also a measure of other factors. The lack of propositions in a summary is, likewise, a measure of many factors, and it can therefore not be assumed to reflect only a lack of comprehension. The lack of propositions could well be attributed to other factors, such

as writing skill, personality variables,
or a combination of many factors.

Most experimental research studies in education are subject to similar limitations, and they imply that all empirical research results must be interpreted cautiously.

Recommendations for Further Research

This study sought to investigate the role of a particular type of visual (contextual) used for a specific purpose (advance organizer). Clearly, before any definitive statements regarding this combination can be made, the study must be replicated with other materials and other populations. More studies are needed, moreover, to investigate the role of other types of visuals used for other purposes. The role of visuals in the other skill areas is, for example, an area in need of much research. By the same token, very little empirical information exists on the effects of visuals on student attitudes. In these times of increased emphasis on learner-centered teaching strategies, information on the effects of visuals on attitudes would seem to be not only useful, but necessary.

Clearly, there are other types of advance organizers whose effects should be empirically tested in the various skill areas. Verbal organizers in both the native

and target languages should be investigated. Additionally, the effects of combining verbal and visual advance organizers on reading and listening comprehension should be studied to determine the most effective combinations.

The variables in different types of visuals (color, size, composition, etc.) should be investigated to determine the most effective and efficient combinations of visuals and instructional strategies. The results of such studies would help to provide an empirical basis for using visuals, and, thereby, replace the "conventional wisdom" that is now so often used to make decisions regarding visual support for language learning.

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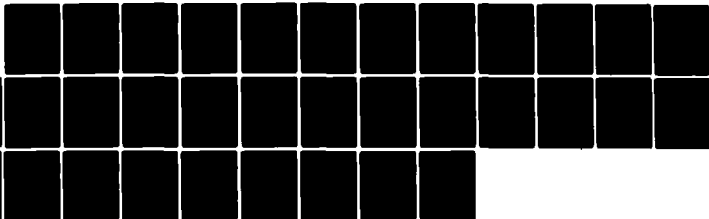
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Appendix A. Pilot Study

1. Introduction and Procedures
2. Design
3. Results
4. Instructions to Students
5. Tape Scripts
6. Listening Passage Texts
7. Contextual Visual

PILOT STUDY

Introduction and Procedures

A pilot of this study was conducted at the Ohio State University on November 9, 1978 with students enrolled in German 102 (G-102). Four sections (intact classes) of G-102 were randomly selected and assigned to one of four experimental conditions. (See design diagram below.) Two listening comprehension passages were developed for the pilot study. These passages differed in degree of difficulty with respect to the vocabulary, structures, and overall length. Both passages are an adaptation of the So Sind Die Deutschen interview used with written permission from the publisher. A jury of five professional German teachers validated the relative difficulty of the passages by consistently rating one more difficult than the other.

The contextual visual (attached) was drawn by a professional illustrator using the guidelines established

in the operational definition section of the main study. Because projection equipment was not available in the classrooms used for the pilot study, each student in the visual-treatment conditions received a printed copy of the contextual visual. After the students had viewed the visual for the designated 30 seconds, the visual was collected.

Two passages were used in the pilot study to determine whether or not combining a visual with an easy passage produced the same results as combining a visual with a difficult passage.

Design

A 2 X 2 Factorial Design was used for the pilot study. With this design, it was possible to test for differences in the visual variable (Visual vs No Visual) and to identify any possible interactions between levels of the visual variable and levels of the difficulty variable. The pilot study had two independent variables each consisting of two levels. The first independent variable was difficulty level with the difficult passage representing one level and the easy passage representing the other level. The other independent variable was availability of a contextual visual with visual representing one level and no visual representing the other level.

This study had one dependent variable. Subjects were asked to write a five-minute summary of the taped passage. They were asked to include as much information as time would permit. (Instructions to students and scripts of the tapes are attached.) The subjects' summaries were scored on the basis of the number of valid semantic propositions they contained. A valid proposition was any fact, piece of information, or logical inference made on the basis of what was heard. In order to keep the scoring procedure as objective as possible, a list of all possible propositions for each passage was developed before the experiment was conducted. This list of propositions was validated by five German teachers to ensure that all possible propositions had been included. To score the papers, the researcher awarded one point for each valid proposition in the summaries for which a corresponding proposition appeared on the designated list. The number of propositions on each paper was then summed into one score which became the dependent variable.

Availability of a Contextual Visual

		<u>Visual</u>	<u>No Visual</u>
D i f f i c u l t y L e v e l	<u>Easy</u>		
	<u>Difficult</u>		

Figure 3. Pilot Study Design. 2 X 2 Factorial Design. Availability of Contextual Visual by Difficulty Level.

Pilot Study Results

The table of results for the pilot study is presented only for information purposes; because of the small n in the Easy-No Visual group and the small sample size $N=40$, no conclusions are justified on the basis of this data.

Table 7. Cell Means and Standard Deviations for Pilot Study Results. (\bar{X} = Number of Propositions)

	<u>n</u>	<u>\bar{X}</u>	<u>S.D.</u>
Easy No Visual	6	8.0	5.90
Easy Visual	11	10.9	4.55
Difficult No Visual	11	6.2	3.52
Difficult Visual	12	9.9	4.12

From a procedural standpoint, there were no problems encountered in the pilot study. The materials used (visual and passages) proved to be appropriate with regard to content, length, level of difficulty, and information density. It was apparent that nearly all students understood some of the passage, while no students understood 100% of the passage as measured by the criterion measure used in this study.

Analyzing the pilot study results according to the research design proved to be somewhat problematic. In short, because each passage had a different total number of propositions, it became clear that there were, in fact, two dependent variables--one for the easy passage and one for the difficult passage. Because the two groups did not receive the same treatment with regard to the difficulty

variable, it was not possible to analyze the data in one design. In effect, there were two separate experiments--one testing the effects of the visual with a difficult passage and one testing the effects of a visual with an easy passage. Testing for interaction between the two variables was not possible because of the incompatibility of the scores.

On the basis of these data analysis limitations, it was decided to modify the original research design. The modifications substantially increased the information yield of the study without really deviating from the original problem. By observing the effects of using a visual with a particular passage across two levels of aptitude for language learning, the original difficulty variable was approached from a slightly different perspective. It seems reasonable to suggest, for example, that the difficulty of a particular passage is relative to the students' aptitude. In other words, given two types of learners--high-aptitude and low-aptitude--the former would probably find any listening passage easier to understand than the latter. In addition to increasing the information yield of the study, the modified design also controlled for the potentially confounding classroom effect.

Appendix A - Pilot Study Materials

Written Instructions to Visual Groups

This is an exercise in listening comprehension. You will hear a short passage read only once. Listen carefully to the passage so that you will be able to write a brief English resumé of its contents. After hearing the passage, you will have five minutes to write your English resumé. Include as much information as time will permit. All instructions are on the tape. The tape is carefully timed, and it will tell you when to begin and when to stop writing.

The picture you see is related to the passage you are about to hear. You may now study the picture for 30 seconds.

Resumé

(Note: The same instructions were on the tape.)

Written Instructions to No-Visual Groups

This is an exercise in listening comprehension. You will hear a short passage read only once. Listen carefully to the passage so that you will be able to write a brief English resumé of its contents. After hearing the passage, you will have five minutes to write your English resumé. Include as much information as time will permit. All instructions are on the tape. The tape is carefully timed, and it will tell you when to begin and when to stop writing.

Resumé

(Note: The same instructions are on the tape.)

Tape Script for No-Visual Groups

1. Written instructions (p. 95) are repeated here.
2. Begin listening to the passage now.
3. Listening comprehension passage is played (Easy for one group and Difficult for the other).
4. You may now take 30 seconds to think about what you heard.
5. (30-second pause on the tape.)
6. Begin writing your resumé now.
7. (5-minute pause on the tape.)
8. Stop writing. This completes the experiment. Thank you for your cooperation.

Tape Script for Visual Groups

1. Written instructions (p. 94) are repeated here.
2. (30-second pause on the tape.)
3. Begin listening to the passage now.
4. Listening comprehension passage is played (Easy for one group and Difficult for the other).
5. Begin writing your resumé now.
6. (5-minute pause on the tape.)
7. Stop writing. This completes the experiment. Thank you for your cooperation.

Listening Comprehension Text: Easy Passage

I = Interviewer HS = Herr Strauss FS = Frau Strauss

I: Frau Strauss, wohnen Sie hier in einer Mietwohnung?

FS: Nein, wir wohnen in einer Eigentumswohnung. Das heisst also, dass wir diese Wohnung kaufen. Wir haben eine Anzahlung gemacht und jetzt zahlen wir jeden Monat unsere Raten statt einer Miete.

I: Ist es immer noch so schwer in Deutschland, eine Wohnung zu finden?

HS: Eigentlich nicht. Die Wohnungsnot ist nicht mehr so gross. Von 1949 bis 1965, zum Beispiel, wurden ungefähr 9 Millionen Wohnungen gebaut.

I: Können viele Deutsche eine eigene Wohnung kaufen?

FS: Das kommt auf das Familieneinkommen an. In unserem Fall bekommt mein Mann nur ein durchschnittliches Gehalt. Um diese Wohnung zu kaufen, haben wir beide jahrelang gearbeitet und Geld gespart.

I: Ihre Wohnung ist sehr schön. Die modernen Möbel gefallen mir besonders gut.

FS: Die Möbel haben wir erst vor einem halben Jahr gekauft.

I: Hat die Wohnung ein oder zwei Schlafzimmer?

FS: Die Wohnung hat zwei Schlafzimmer.

HS: Ausser den Schlafzimmern, der Küche, und dem Wohnzimmer hat die Wohnung natürlich auch ein Badezimmer und im Keller einen Abstellraum.

I: Sind Sie mit dieser Wohnung zufrieden?

HS: Ja, diese Wohnung gefällt uns sehr gut.

I: Nun, ich wünsche Ihnen viel Erfolg und danke für Ihre Auskunft.

Listening Comprehension Text: Difficult Passage

I = Interviewer HS = Herr Strauss FS = Frau Strauss

I: Herr Strauss, erzählen Sie uns bitte etwas über die Wohnmöglichkeiten in Deutschland nach 1945.

HS: Nach dem Krieg waren in Deutschland über 20% aller Wohnungen total zerstört oder so schwer beschädigt, dass sie nicht mehr bewohnt werden konnten. 30% aller Wohnungen waren teilweise beschädigt.

I: Vor ein paar Jahren war es doch noch für viele Deutsche unmöglich, bessere Wohnungen zu finden. Diese Wohnungsnot scheint sich aber neuerdings etwas gebessert zu haben.

HS: Ja, das stimmt. Heute baut man immer noch viele Wohnungen aber zwischen 1949 und 1965 allein wurden ungefähr 9 Millionen Wohnungen gebaut. In diesen Wohnungen wohnen 25 Millionen Menschen. Das sind 40% der Bevölkerung.

I: Frau Strauss, Ihr Mann hat gesagt, dass Sie hier in einer Eigentumswohnung wohnen. Was ist der Unterschied zwischen einer Eigentumswohnung und einer anderen Wohnung?

FS: Die meisten Leute in Deutschland wohnen in einer Mietwohnung. Diese Leute zahlen also eine monatliche Miete. Andererseits gibt es Wohnungen, die man kaufen kann. Mein Mann und ich, zum Beispiel, zahlen keine Miete, sondern gewisse Raten. Nach einer bestimmten Zeit haben wir dann unsere Wohnung gekauft.

I: Ist es für viele Deutsche schwierig, eine Eigentumswohnung zu besitzen?

FS: Das kommt auf das Familieneinkommen an. In unserem Fall bekommt mein Mann nur ein durchschnittliches Gehalt. Um diese Wohnung zu kaufen, haben wir beide jahrelang gearbeitet und Geld gespart.

I: Sie haben Ihre Wohnung sehr schön eingerichtet. Ihre modernen Möbel hier im Wohnzimmer gefallen mir besonders gut.

FS: Die Möbel haben wir erst vor einem halben Jahr gekauft. Wir sind besonders stolz auf die beiden

Sessel und das Sofa.

HS: Trotzdem glaube ich, dass meine Frau am liebsten in der Küche arbeitet, denn dort haben wir die neusten elektrische Geräte.

I: Wie viele Schlafzimmer hat diese Wohnung?

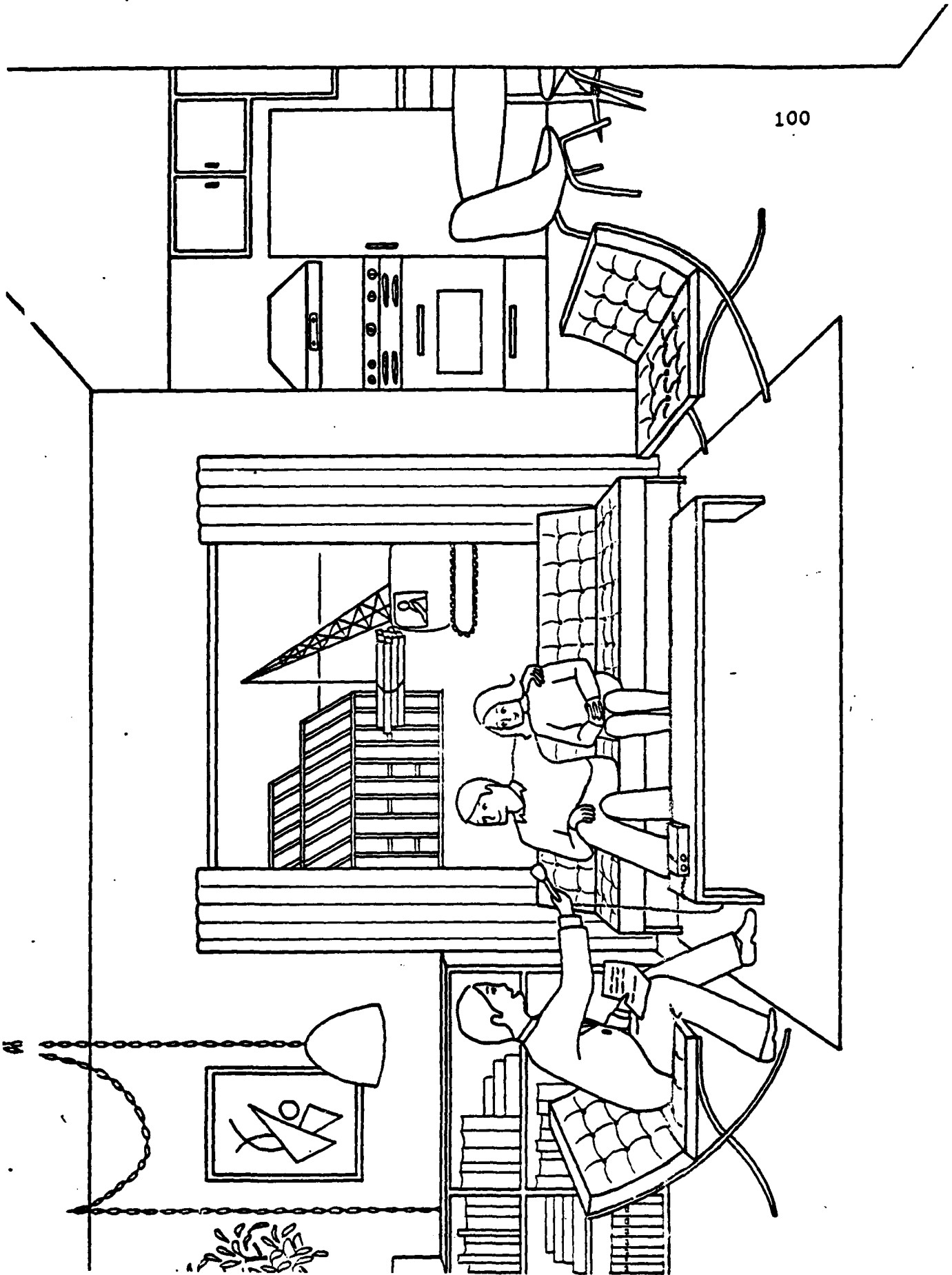
FS: Wir haben zwei Schlafzimmer. Wir wollten auf eventuellen Familienzuwachs vorbereitet sein.

HS: Ausser den beiden Schlafzimmern, dem Wohnzimmer, und der Küche haben wir natürlich auch noch ein Badezimmer und im Keller einen Abstellraum.

I: Sie scheinen mit Ihrer Wohnung sehr zufrieden zu sein.

HS: Da haben Sie vollkommen recht. Nachdem wir so lange gespart haben, sehen wir langsam den Erfolg unserer Arbeit.

I: Nun, ich wünsche Ihnen weiterhin viel Erfolg und bedanke mich recht herzlich für Ihre Auskunft.



Appendix B. Main Study

1. Listening Passage Text
2. Criterion Instrument
3. Instructions to Students
4. Tape Scripts
5. Contextual Visual

Listening Passage Text (Main Study)

I = Interviewer HS = Herr Strauss FS = Frau Strauss

I: Herr Strauss, erzählen Sie uns bitte etwas über die Wohnungen in Deutschland nach 1945.

HS: Nach dem Krieg waren in Deutschland über 20% aller Wohnungen total zerstört oder so schwer beschädigt, dass sie nicht mehr bewohnt werden konnten. 30% aller Wohnungen waren teilweise beschädigt.

I: Vor ein paar Jahren war es doch noch für viele Deutsche unmöglich, gute Wohnungen zu finden. Heute gibt es aber viele, neue Wohnungen. Wann wurden denn diese Wohnungen gebaut?

HS: Heute baut man immer noch viele Wohnungen aber zwischen 1949 und 1965 allein wurden ungefähr 9 Millionen Wohnungen gebaut. In diesen Wohnungen wohnen 25 Millionen Menschen.

I: Frau Strauss, Ihr Mann hat gesagt, dass Sie hier in einer Eigentumswohnung wohnen. Was ist der Unterschied zwischen einer Eigentumswohnung und einer anderen Wohnung?

FS: Die meisten Leute in Deutschland wohnen in einer Mietwohnung. Diese Leute zahlen also eine monatliche Miete. Andererseits gibt es Wohnungen, die man kaufen kann. Mein Mann und ich, zum Beispiel, zahlen keine Miete, sondern gewisse Raten. Nach einer bestimmten Zeit haben wir dann unsere Wohnung gekauft.

I: Ist es für viele Deutsche schwer, eine Eigentumswohnung zu kaufen?

FS: Das kommt auf das Familieneinkommen an. In unserem Fall bekommt mein Mann nur ein durchschnittliches Gehalt. Um diese Wohnung zu kaufen, müssen wir beide arbeiten.

I: Sie haben eine sehr schöne Wohnung hier. Ihre modernen Möbel im Wohnzimmer gefallen mir besonders gut.

FS: Die Möbel haben wir erst vor einem halben Jahr gekauft. Wir sind besonders stolz auf die beiden Sessel und das Sofa.

I: Wie viele Zimmer hat diese Wohnung?

FS: Wir haben vier Zimmer. Wir wollten auf eventuellen Familienzuwachs vorbereitet sein.

HS: Ausser den Schlafzimmern, dem Wohnzimmer, und der Küche haben wir natürlich auch ein Badezimmer und im Keller einen Abstellraum.

I: Sind Sie mit dieser Wohnung zufrieden?

HS: Ja, diese Wohnung gefällt uns sehr gut. Meiner Frau gefällt die moderne Küche am besten, denn dort haben wir einen elektrischen Herd, einen Geschirrspüler und mehrere elektrische Geräte.

I: Nun, vielen Dank für die Auskunft. Auf Wiedersehen.

HS: Auf Wiedersehen.

FS: Auf Wiedersehen.

Criterion Instrument: List of Acceptable Propositions

This is an interview.

Two people are being interviewed.

The two people are married (man and wife).

Their name is Strauss.

They are German.

They live in an apartment.

The man (Mr. Strauss) is asked to talk about apartments.

He is asked to talk about German apartments (dwellings).

He tells about the apartments after WW II (1945).

He talks about German housing.

20% of all dwellings were destroyed or damaged.

The damage was heavy.

This 20% was uninhabitable.

30% of all dwellings were partially damaged.

It was impossible for many Germans to find good housing.

This was still true recently.

As recently as a few years ago.

Today, there are many apartments (dwellings) in Germany.

These apartments are new.

The interviewer asks when they were built.

Many are still being built today.

Many were built between 1949 and 1965.

Nine Million were built then.

Twenty-five million people live in these apartments.

Strausses live in a privately-owned apartment.

There are other types of apartments.

The interviewer asks how the apartments differ.

The other apartments are rental apartments.

Most Germans live in this type (rental).

These people pay rent.

They pay the rent monthly.

Some apartments can be bought.

Strausses live in one of these.

They do not pay rent.

They make loan payments.

They make loan payments instead of paying rent.

Eventually, they will own the apartment.

They will own it when the loan has been paid off.

The interviewer asks how difficult it is for Germans to buy their own apartments.

That depends upon the family's income.

Mr. Strauss earns only an average salary.

Mrs. Strauss also works.

She works so that they can afford the apartment.

The apartment is very nice.

It has furniture.

The interviewer likes the furniture.

It (the furniture) is modern.

It is relatively new.

Strausses bought this furniture.

They bought it about six months ago.

They are proud of the furniture.

They are especially proud of the sofa and the two chairs.

The interviewer asks how many rooms the apartment has.

It has four.

They (Strausses) want to be prepared for additions to the family.

The apartment has bedrooms.

The apartment has a living room.

The apartment has a kitchen.

The apartment has a bathroom.

There is also a basement.

There is a storage room in the basement.

The interviewer asks if Strausses are satisfied with the apartment.

They are satisfied.

They like the apartment very well.

Mrs. Strauss likes the kitchen best.

It (the kitchen) is modern.

It has an electric stove.

It has a dishwasher.

It has several electrical appliances.

The interviewer thanks them for the information.

Everybody says good-bye.

Three people are talking.

One woman and two men are talking.

One man seems to be asking questions.

Many homes were destroyed during the war.

There was a massive rebuilding program.

It is expensive to own a home in Germany.

Strausses have no children.

They (Strausses) like modern things (furniture, appliances, etc.)

The interview takes place in their apartment.

The man asking the questions is a stranger.

The discussion (interview) deals with German housing in general.

It also deals with a specific apartment.

The Strausses seem friendly.

They seem eager to talk about their apartment.

(Total Number of Propositions = 85)

Written Instructions to Students

TO THE STUDENT: The listening comprehension exercise scheduled for today is part of a research experiment. Participating in this experiment will give you some additional listening practice and provide you with a valuable self-test opportunity. THE RESULTS OF THIS EXPERIMENT WILL NOT AFFECT YOUR COURSE GRADES. Your participation in this experiment is completely voluntary. If you choose not to participate, raise your hand, and your instructor will give you some other work to do during the experiment.

INSTRUCTIONS: This is an exercise in listening comprehension. You will hear a short, taped passage played only once. Listen carefully to the taped passage so that you can write a summary of its contents on the attached sheet. After hearing the passage, you will have seven (7) minutes to write your summary. WRITE YOUR SUMMARY IN ENGLISH, and include as much information as time will permit.

While listening to the passage, feel free to jot down notes in the space provided below. Feel free also to guess at the meaning of any unfamiliar words or phrases you may encounter.

All further instructions are on the tape. The tape has been carefully timed so that it will tell you exactly when to begin listening to the passage, when to begin writing your English summary, and when to stop writing.

NOTES:

Summary SheetWRITE YOUR E N G L I S H SUMMARY BELOW.

Tape Script for Visual-Before Groups

This is an exercise in listening comprehension. You will hear a short, taped passage played only once. Listen carefully to the taped passage so that you can write a summary of its contents on the attached sheet. After hearing the passage, you will have seven minutes to write your summary. Write your summary in English and include as much information as time will permit.

While listening to the passage, feel free to jot down notes in the space provided below. Feel free also to guess at the meaning of any unfamiliar words or phrases you may encounter. All further instructions are on this tape. The tape is carefully timed so that it will tell you when to begin listening to the passage, when to begin writing, and when to stop writing.

The picture you see on the screen and the passage you are about to hear are related. You may now study the picture for 30 seconds. (30 SECOND PAUSE ON THE TAPE) Remember that you will hear the passage only once. Begin listening now! (PASSAGE IS PLAYED.) Begin writing your summary now! (7-MINUTE PAUSE ON THE TAPE) Stop writing! Your papers will now be collected. Thank you for your cooperation in this experiment.

Tape Script for Visual-After Groups

This is an exercise in listening comprehension. You will hear a short, taped passage played only once. Listen carefully to the taped passage so that you can write a summary of its contents on the attached sheet. After hearing the passage, you will have seven minutes to write your summary. Write your summary in English and include as much information as time will permit.

While listening to the passage, feel free to jot down notes in the space provided below. Feel free also to guess at the meaning of any unfamiliar words or phrases you may encounter. All further instructions are on this tape. The tape is carefully timed so that it will tell you when to begin listening to the passage, when to begin writing, and when to stop writing.

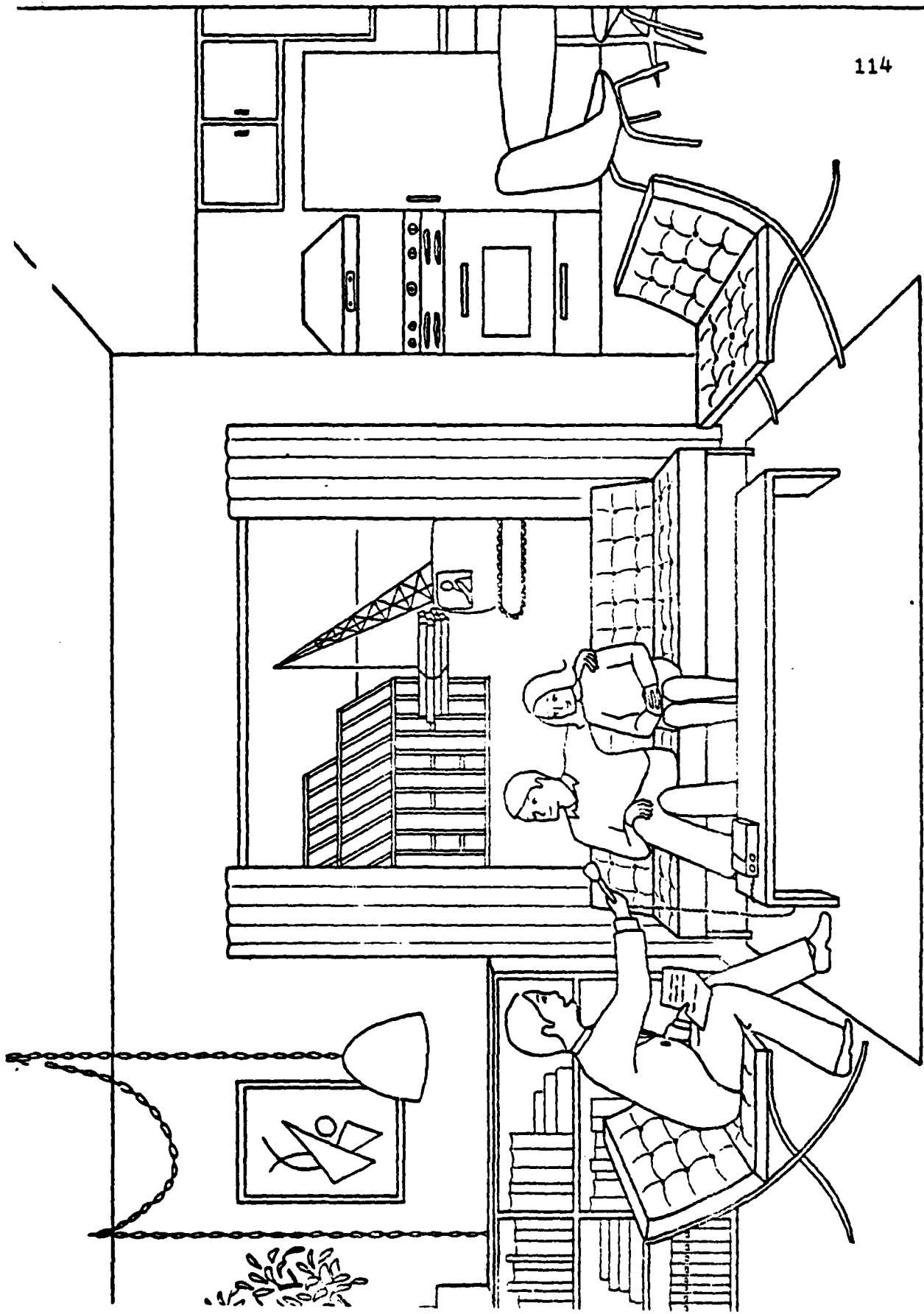
Remember that you will hear the passage only once. Begin listening to the passage now! (PASSAGE IS PLAYED.) The picture you see on the screen and the passage you just heard are related. You may now study the picture for 30 seconds. (30-SECOND PAUSE ON THE TAPE) Begin writing your summary now! (7-MINUTE PAUSE ON THE TAPE) Stop writing! Your papers will now be collected. Thank you for your cooperation in this experiment.

Tape Script for No-Visual Groups

This is an exercise in listening comprehension. You will hear a short, taped passage played only once. Listen carefully to the taped passage so that you can write a summary of its contents on the attached sheet. After hearing the passage, you will have seven minutes to write your summary. Write your summary in English and include as much information as time will permit.

While listening to the passage, feel free to jot down notes in the space provided below. Feel free also to guess at the meaning of any unfamiliar words or phrases you may encounter. All further instructions are on this tape. The tape is carefully timed so that it will tell you when to begin listening to the passage, when to begin writing, and when to stop writing.

Remember that you will hear the passage only once. Begin listening now! (PASSAGE IS PLAYED.) You may now take 30 seconds to think about what you heard. (30-SECOND PAUSE ON THE TAPE) Begin writing your summary now! (7-MINUTE PAUSE ON THE TAPE) Stop writing! Your papers will now be collected. Thank you for your cooperation in this experiment.



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